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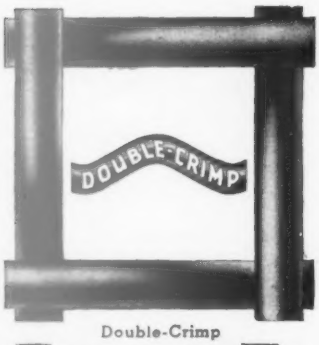
# PIT AND QUARRY

AUGUST, 1944

FOR 27 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

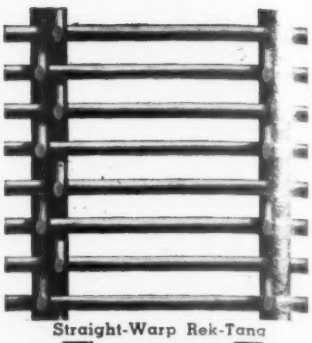
AUG 19 1944



Double-Crimp

# "The Perfect"

## Wire Cloths and Screens


Straight-Warp Rek-Tang

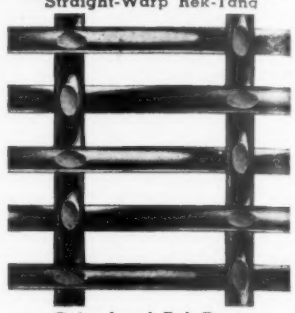
of

SUPER-LOY
STEEL
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

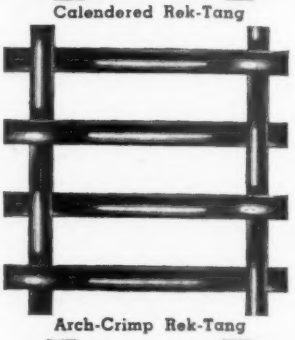
•

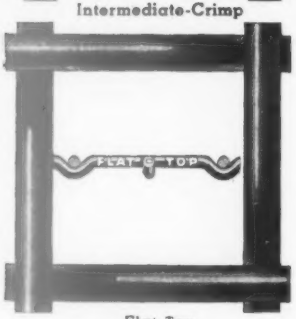
**Any Special Metal for Any Service**

Arch-Crimp

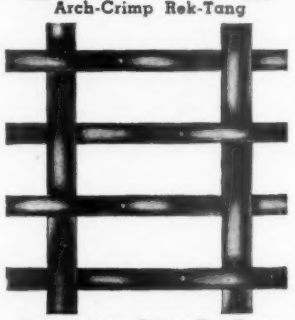

Calendered Rek-Tang

Intermediate-Crimp


Arch-Crimp Rek-Tang



Flat-Top


Intermediate-Crimp Rek-Tang

### "Perfect" WEAVES

**ARCH-CRIMP**
Coiled
**DOUBLE-CRIMP**
Double-Fill
Dutch
**FLAT-TOP**
**INTERMEDIATE-CRIMP**
**REK-TANG**
Selvage-Edge
**STRAIGHT-WARP**
Stranded
**STA-TRU**
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

### "Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
**CALENDERING**
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming

### "Perfect" PRODUCTS

Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

*Illustrations show items listed in capitals. Other wire cloths and screens will be illustrated in subsequent advertisements of this series.*

Sta-Tru

**THE LUDLOW-SAYLOR WIRE CO.**

**ST. LOUIS 10, MISSOURI**

LINK-BELT

MATERIALS HANDLING AND POWER TRANSMISSION MACHINERY

AUG 21 1944

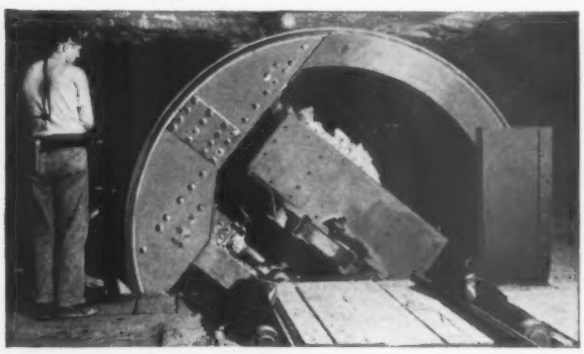
SERVES THE ENTIRE INDUSTRY

**BELT CONVEYORS** perform a very important job at this mine in keeping zinc-lead ores "on the move." Link-Belt designs offer the best in belt conveyor equipment.

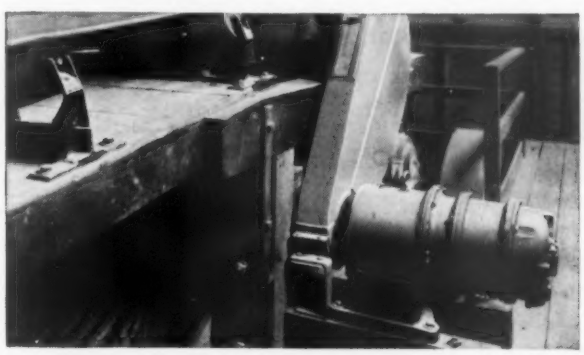
**P.I.V. GEAR VARIABLE SPEED CHANGERS** accurately control speeds of conveyors, feeders, ball mills, etc.

**VIBRATING SCREENS** assure high efficiency and low-cost operation on both liquid and dry screening applications.

**SORTING-TABLE FEEDER-CONVEYOR** handling ore from mine to crusher—one of the many types of Link-Belt Feeders in service in the mining industry.



**ROTARY MINE CAR DUMPER** on 900-ft. level dumping a 6-ton ore car into bin over primary crusher.



**MOTORIZED SPEED REDUCER** and **ROLLER CHAIN DRIVE** operating head shaft of belt conveyor.

**LINK-BELT EQUIPMENT INCLUDES:** Complete Sand, Gravel and Stone Washing Plants . . . Ready-Mixed Concrete Plant Equipment . . . Lime Handling Equipment . . . Screens (vibrating, rotary and conical) . . . Washers and Classifiers, of the screw, log, flight, Shaw and conical types . . . Dewatering Rotoscoops and Screw Conveyors . . . All Types of Elevators and Conveyors . . . Roto-Louvre Dryers and Coolers . . . Skip Hoists . . . Car Spotters and Haulage Systems . . . Portable Conveyors and Bucket Loaders . . . Silent and Roller Chain Drives . . . Speed Reducers . . . Variable Speed Transmissions . . . Chains (Malleable Iron, Promal and Steel) . . . Sprockets . . . Elevator Buckets . . . Gears . . . Clutches . . . Couplings . . . "Friction Fighter" Self-Aligning Ball and Roller Bearing Units . . . Babbitted Bearing Units, etc.

9534-C

As specialists in the design, manufacture and application of materials handling and power transmission machinery for all industry, Link-Belt engineers have learned how to apply an extensive knowledge and experience, effectively, to the solution of all kinds of materials handling and power transmitting problems. Because Link-Belt makes many types of conveyors, chains and power transmitting machinery, we can be of incalculable service in recommending the equipment most certain to aid in attaining efficient production.

**LINK-BELT COMPANY** Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8. Offices in principal cities.

PIT AND QUARRY, August, 1944, Vol. 37, No. 2. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

# Upson-Walton Specifications for Steel Wire have Never been relaxed!

BACK in 1916, when Upson-Walton first began to manufacture wire rope, we set up rigorous standards which every foot of steel wire we use must measure up to.

Those standards have never been lowered. Even material shortages in these war years have not been allowed to influence them.

All Upson-Walton wire rope sold today is, at the very least, as good as the finest quality we've ever made. In some respects it is even better, where engineering improvements have been added.

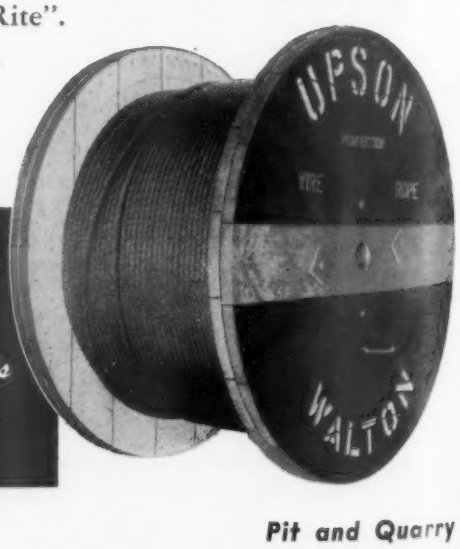
When you specify Upson-Walton, you're always sure of getting the best grade of wire rope. And it costs no more!

When you want Preformed, specify "Upson-Walton Lay-Rite".

U-W

Established 1871

*Upson-Walton also manufactures wire rope clips, thimbles and sockets; tackle blocks, snatch blocks, turnbuckles and shackles.*




## THE UPSON-WALTON COMPANY

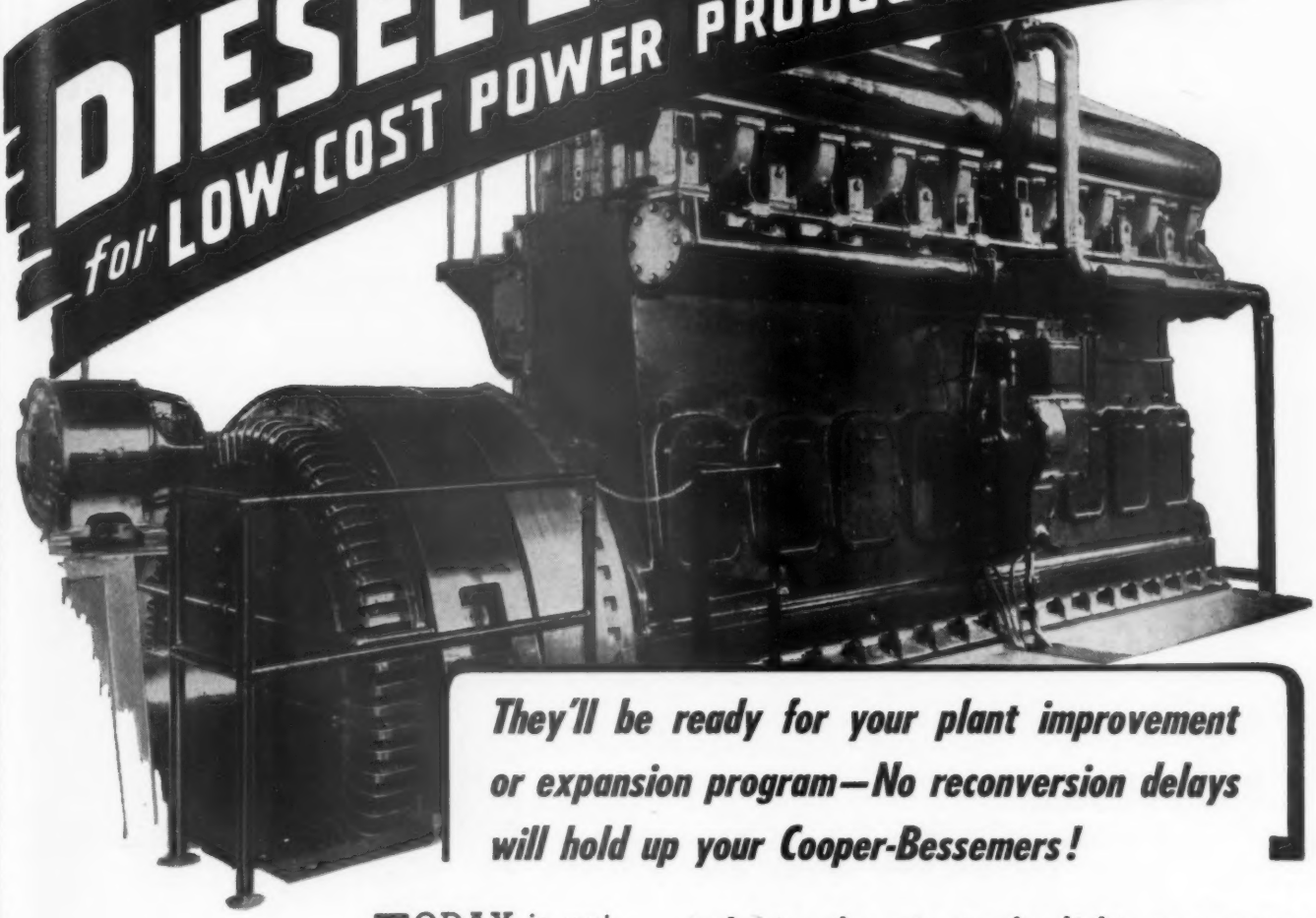
*Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks*

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

# Order NOW

# DIESEL ENGINES

## for LOW-COST POWER PRODUCTION .....



***They'll be ready for your plant improvement or expansion program—No reconversion delays will hold up your Cooper-Bessemers!***

TODAY is not too early to talk about your future power requirements—about diesel power.

Diesel power has come of age in this war. Diesel engines of many types and sizes are turning in amazing performances all over the world, in ships of every kind, in utilities' central stations, factories, mines and oil fields.

In your own business, there are power jobs that can be done expeditiously, economically by diesel — driving generators, or pumps, or blowers, or compressors. Now is the time to determine what you need and take steps to get your engines earmarked for quick delivery.

Cooper-Bessemer has diesel engines to sell. Right now our factories are devoted 100% to government contracts and high priority orders. But our advance manufacturing program is forming now. Our plants have no reconversion problems. We are ready to serve private industry the minute the light goes green.

The engines you get will be all the better for our 100% war experience. They benefit from the concentration of ten years normal engineering development crowded into two or three. They will give you the same outstanding service that diesels are delivering today on the war and production fronts.

We are ready now to figure on your present and future power requirements. Ask for our representative, to sit down with you at your convenience, to determine what types and sizes you'll need. Let's make a start on your problem now.

**THE Cooper-Bessemer CORPORATION**

Mt. Vernon, Ohio • Grove City, Pa.

BUILDERS OF DEPENDABLE ENGINES FOR 111 YEARS

# ONE of these GATES V-Belts Will Fit ANY NEED You May Have!

**Rayon Cord** V-Belts
**Static-Safety** V-Belts
*Special* **Synthetic** V-Belts
**Cotton Cord** V-Belts
**Steel Cable** V-Belts

If you have a drive on which V-Belts of special construction may be required for greatest service efficiency, you will almost certainly find that Gates has long been building a V-Belt precisely engineered to fit your special needs.

On some installations, for example, a V-Belt, the tension member of which is composed of rayon cords will have advantages over the standard cotton cord construction. Gates has been building Rayon-Cord belts since 1939.

Again, Gates Rubber Engineers have found that a belt built with flexible steel cables as the tension member is sometimes most economical despite its higher initial cost—and Gates has been building flexible Steel-Cable V-Belts since 1935.

**For more than six years, the Gates Synthetic Rubber belt has been making amazing service records in large industrial plants all over the United States. Under severe conditions of heat and oil the Gates special Synthetic belt actually wears 2 times to 3 times as long as any natural rubber belt ever used.**

It might seem that it would be some trouble to determine whether a synthetic-rayon, a synthetic-steel-cable, or a standard Gates Vulco Rope would be most efficient and economical for your particular application. Actually, this involves no more than picking up your phone.

There is a Gates Rubber Engineer in every industrial center. A phone call will bring him to your plant. He is a specialist in drive operation. He is completely informed on the nature and advantages of every type of belt. He will always recommend the practice that will be most efficient and economical for you

***In one of the World's LONGEST TUNNELS***

**This big blower keeps the air clear in the 13.2 mile Alva B. Adams Tunnel which was "holed-thru" the Continental Divide on June 10. After firing a round, workmen may return to mucking immediately with the air free from smoke or powder fumes. On this big installation, the Gates RUBBER ENGINEER specified standard Vulco Ropes which have performed with splendid efficiency.** 448

THE GATES RUBBER COMPANY
*Engineering Offices and Stocks in All Large Industrial Centers*

**GATES VULCO ROPE DRIVES**

**CHICAGO, ILL.** 549 West Washington
**NEW YORK CITY** 215-219 Fourth Avenue
**ATLANTA, GA.** 738 C & S National Bank Building
**LOS ANGELES, CAL.** 2240 East Washington Boulevard
**DENVER, COLO.** 999 South Broadway
**DETROIT, MICH.** 8663 Grand River Avenue
**PORTLAND, ORE.** 333 N. W. 5th Avenue
**DALLAS, TEXAS** 2213 Griffin Street
**SAN FRANCISCO, CAL.** 1090 Bryant Street

# Gulf Products

## help contractor get top performance from equipment on naval hospital project

R. A. Bowen, Macon, Georgia, was awarded two separate contracts on this U. S. Navy Hospital project. The first, which was finished ahead of schedule, required grading 500,000 yards of earth. The second, now well along, calls for moving 200,000 yards. Complete landscaping is involved in both contracts. The photo directly above shows a Gulf Service Engineer (right) consulting with Superintendent E. J. Smith and Assistant Superintendent C. F. Myer on lubrication and fuel requirements for the job.

***"No unnecessary delays, and better all-round job efficiency with Gulf lubricants and fuels are two important reasons why we're ahead of schedule"—***

**says Superintendent E. J. Smith**

R. A. Bowen is pushing equipment to the limit to finish all grading operations ahead of schedule on the huge naval hospital project pictured above. Gulf quality lubricants and fuels are helping keep this equipment continuously on the job and operating at maximum efficiency. Superintendent E. J. Smith has found that it's good job insurance to specify Gulf products.

On job after job throughout the country Gulf quality lubricants and fuels are playing an enormously important part in keeping contracting equipment rolling on fast schedules and under punishing operating conditions. They work as a team to insure top performance, a minimum of delays, and low maintenance costs.

You, too, can enjoy the proven benefits provided by Gulf products. No matter where your job is located, you are sure of quick delivery through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write, wire, or phone your nearest Gulf office today.

GULF

GULF OIL CORPORATION · GULF REFINING COMPANY
GULF BUILDING · PITTSBURGH 30, PA.

# It pays to be a Bemis Multiwall paper bag Customer

EVEN though direct government purchases have taken a considerable part of our multiwall paper bag production this year, Bemis customers have not suffered . . . they have been supplied on the basis of past purchases, even in the face of the labor shortage and no increase in facilities.

Naturally, the demand for Multiwalls has been greater than the supply. Much as we regret inability to fill all orders, we have felt a responsibility to take care of our regular customers first. Fortunately, we've been able to do that—and right on schedule. If it's humanly possible, we'll keep on maintaining this service.

War or peace, we want our customers to feel that it pays to be Bemis customers.

NORTH
WEST EAST
SOUTH

A major reason we've been able to supply our Multiwall customers is the size and flexibility of our production facilities.

*Bemis Multiwall Plants at*

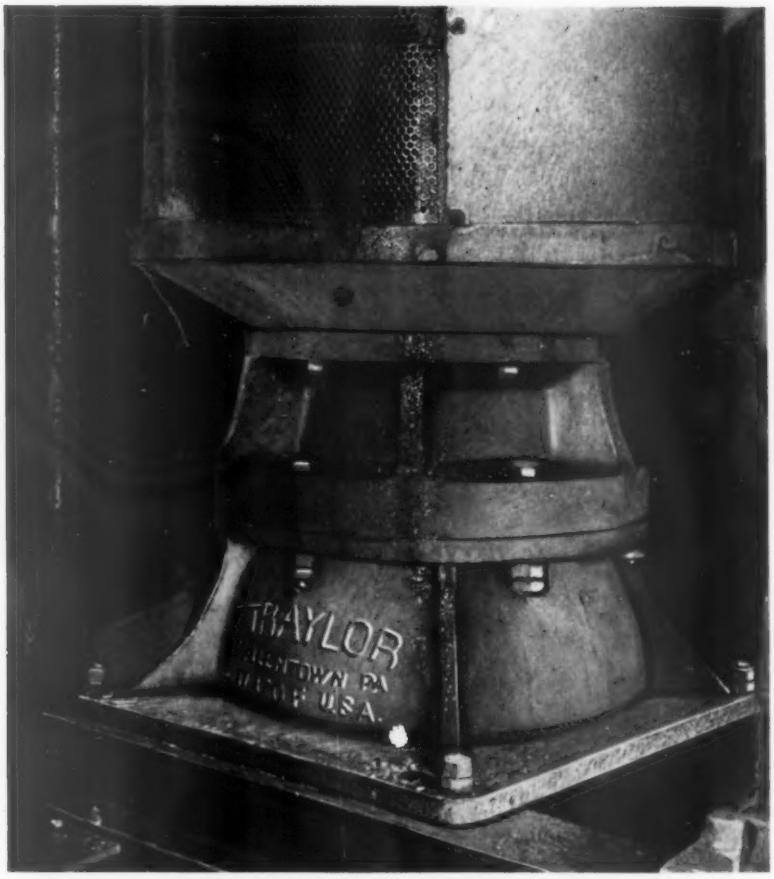
**PEORIA, ILL.**
**EAST PEPPERELL, MASS.**
**MOBILE, ALA.**
**SAN FRANCISCO, CALIF.**
**WILMINGTON, CALIF.**
**ST. HELENS, ORE.**

These plants not only give us large production, but also quick accessibility to all parts of the country.

**BEMIS BRO. BAG CO.** Baltimore · Boston · Brooklyn · Buffalo · Charlotte · Chicago · Denver · Detroit · Houston · Indianapolis · Kansas City · Los Angeles · Louisville · Memphis · Minneapolis · New Orleans · New York City · Norfolk · Oklahoma City · Omaha · St. Louis · Salina · Salt Lake City · Seattle · Wichita

# *in Reduction Crushers*

# "Type TY" means "finest"




## WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

At least, that's what is said of the Traylor Type TY Reduction Crusher by the hundreds of users in stone plants, gravel plants, cement plants, chemical plants and mining. Many of them back up their words too, by re-ordering!

The reason? It must be because the TY is a four-way guarantee of extra profits: (1) delivery of the kind of product desired, of the right size and enough of it; (2) strength enough to stand up under its hard job; (3) economical use of wearing metal and power and inexpensive maintenance; (4) 100% foolproofness.

If you don't know this crusher, the quicker you get acquainted, the quicker you'll make those extra dollars! Write us today!

## WRITE FOR BULLETIN 3112

# TRAYLOR

## ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

NEW YORK CITY 3416 Empire State Bldg. | CHICAGO 2051 One La Salle St. Bldg. | SALT LAKE CITY 101 West Second South St. | LOS ANGELES 919 Chester Williams Bldg. | SPOKANE S. 2707 Rhyolite Rd.

B. C. EQUIPMENT CO., LTD.
551 Howe St., Vancouver, B. C.

Export Department — 104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo, La Paz

# GREATLY REDUCES *Bearing Wear and Replacements* . . . yet it is as SIMPLE as ABC . . .

NO OBLIQUE RESULTANT
ALL RADIAL loads carried at RIGHT ANGLES to the roller axis
ALL THRUST loads carried at RIGHT ANGLES to the roller axis

**A** all radial loads carried at right angles to the roller axis

**B** all thrust loads carried at right angles to the roller axis

**C** no oblique components to complicate radial and thrust pressures.

with

## ROLLWAY RIGHT-ANGLED LOADING

Costs pared to the bone! That will be the production slogan after the war. And right now — with new designs on your boards — is the time to think about new, longer-wearing or higher-capacity bearings . . . both for your production machinery, and for the products you make. Find out how Rollway's Right-Angled Bearing Loading will simplify the loads. How it will permit smaller housings, heavier pressures, or longer bearing life — even proportionate combinations of all three.

For compound loads, SEPARATE radial and thrust bearings are used in combination as per diagram.

### Rollway Splits the Load, Reduces the Pressures

Because Rollway Roller Bearings are always loaded at right angles to the roller axis, only one load component—either pure radial or pure thrust—can bear upon the rollers. That means reduced load pressures within easily computed limits, greater resistance to shock, oscillating or vibrating loads, and to overloads. No oblique components can raise the stresses above the elastic limits. You know the simple forces you are dealing with, and you can provide for them adequately.

### SAE and American Standard Metric Sizes

Rollway has developed many variations of its solid cylindrical roller bearings in SAE and American Standard metric sizes, each having definite characteristics to meet exacting needs.

Let us help you to take full advantage of this wide choice of types and sizes. Just send us your design, or a detailed description for free, confidential analysis. No obligation.

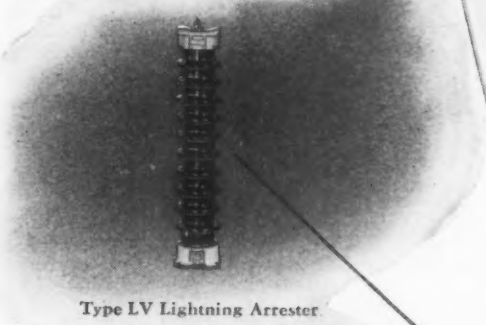
**ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK**

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

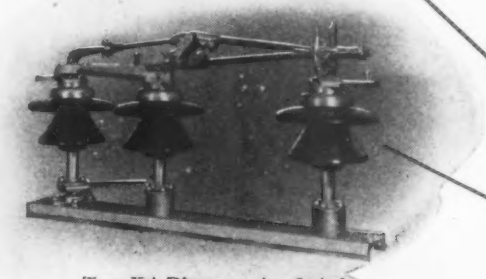
PLAN FOR RELIABLE, SAFE

# Power Distribution

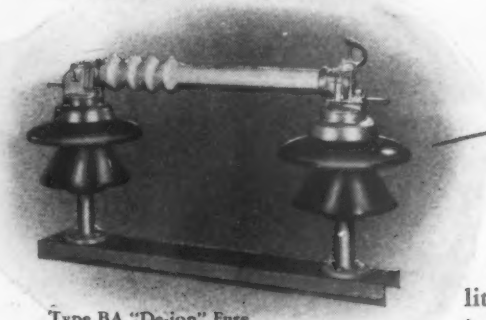
IN OPEN-PIT MINES AND QUARRIES



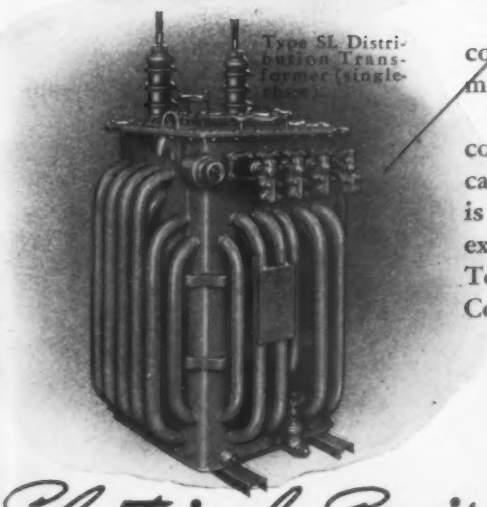
Type LV Lightning Arrester



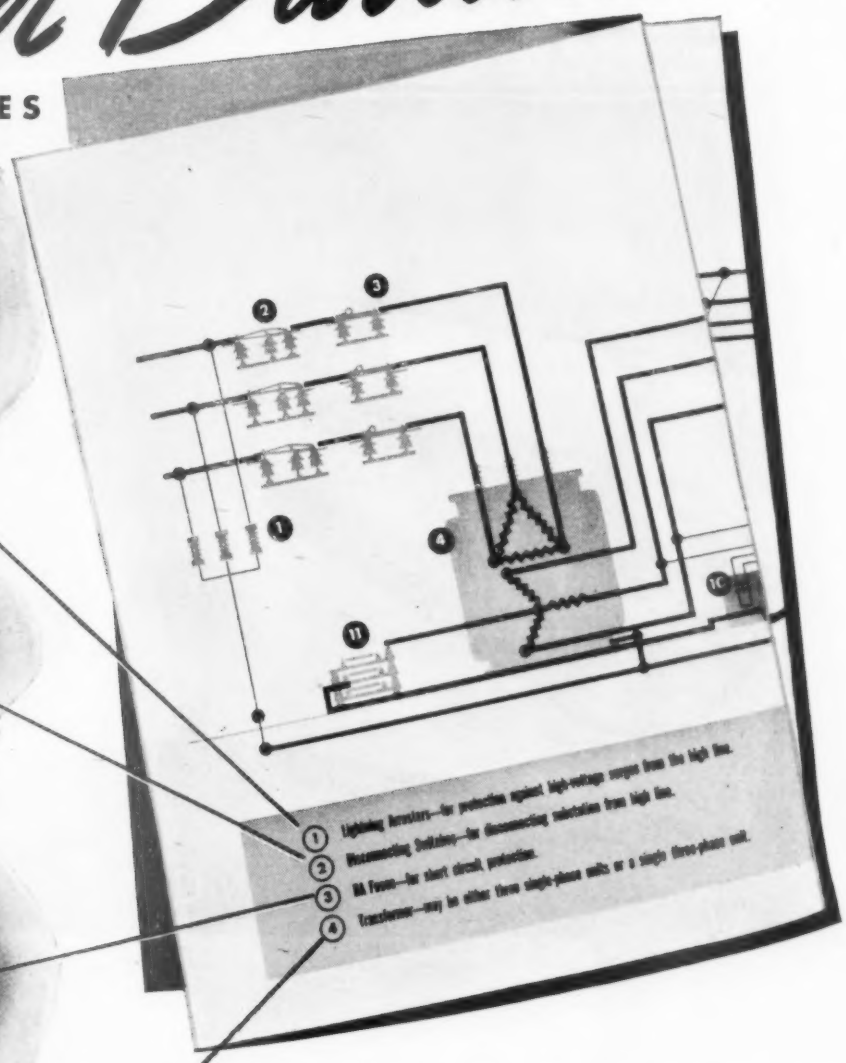
Type KA Disconnecting Switch



Type BA "De-ion" Fuse



Type SL Distribution Transformer (single-phase)


1
2
3
4
11
1C
1 Lightning Arresters—for protection against high-voltage surges from the high line.
2 Disconnecting Switches—for disconnecting substation from high line.
3 BA Fuses—for short circuit protection.
4 Transformer—may be either three single-phase units or a single three-phase unit.

A properly engineered electric power distribution system costs little more than one which is hazardous and unreliable. The reward is increased production—and the safeguarding of your employees' lives.

You owe it to yourself to check your present system for the all-too-common sources of trouble. Probably you will find that a small investment in one or two simple protective devices is all that is needed.

Westinghouse manufactures every type of equipment needed for a complete modern open-pit distribution system. How this equipment can be adapted to your present system to provide adequate protection is shown in a new book, B-3282, just issued. Typical of the many explanatory illustrations it contains, is the sample page shown above. To get your free copy write Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pennsylvania. J-94609

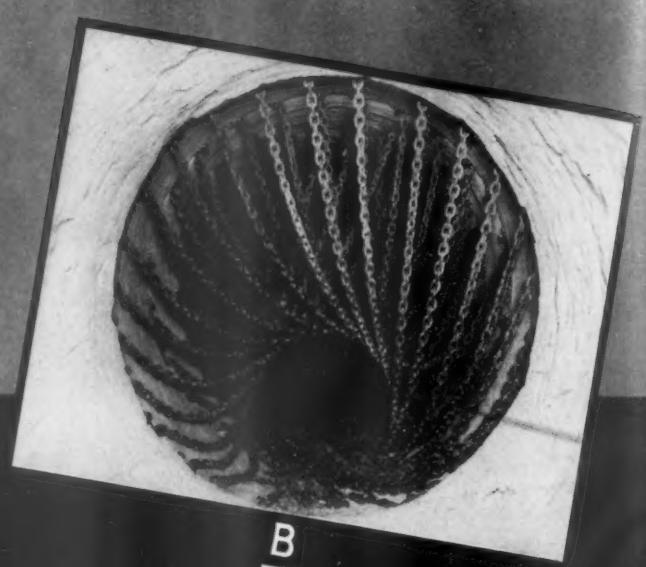
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

*Electrical Equipment for the Mining Industry*

# 3 WAYS TO SAVE FUEL

A



B

C

A
Heat Exchangers for Dry Kilns

B
Chain Systems for Wet Kilns

C
Unax Cooler Integral with Rotary Kiln

## F. L. SMIDTH & CO.

60 EAST 42ND STREET — ENGINEERS AND MACHINERY MANUFACTURERS — NEW YORK, N. Y.

# Shovels Are Weapons, Too

## *Good Blasting S-t-r-e-t-c-h-e-s Their Life*

Increase production by getting more work out of your present quarrying equipment. Make buckets stretch—as far as possible, and last as long as possible.

Good blasting is one of the most effective "bucket-stretchers" you can find. And, an important part of good blasting is—use the right explosive for your job. Examine, for example, the qualifications of

## ATLAS APEX

Low nitroglycerine, ammonium nitrate type of explosive with a heaving, spreading action. Adapted for use in either horizontal or vertical drill holes. Available in eight strengths—each strength in three velocities (low, medium, or high)—there are 24 combinations of speed and strength. One of these should provide just the right action for your formation.

Working synergistically* with explosives users, Atlas representatives have been able to help on many jobs. Perhaps they can make your equipment go further, too.

***Synergism**—*The meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total expressed—a "2 + 2 = 5" result. Synergism can be a big help toward making your equipment last longer.*

**APEX**

| GRADE | % Weight Strength | Velocity feet per second, in the open 1¼" x 8" | VELOCITIES 4½" x 16" CTGS. | | | Number of Cartridges per 50 lbs. 1¼" x 8" |
|---|---|---|---|---|---|---|
| | | | LOW | MEDIUM | HIGH | |
| A | 35 | 7000 | 10500 | 13000 | 19000 | 115 |
| B | 30 | 6900 | 9500 | 13000 | 19000 | 115 |
| C | 25 | 6500 | 9000 | 13000 | 19000 | 115 |
| D | 20 | 6500 | 9000 | 13000 | 19000 | 115 |
| 1 | 40 | 7200 | 10500 | 13000 | 19000 | 115 |
| 2 | 50 | 7300 | 10500 | 13000 | 19000 | 115 |
| 3 | 60 | 7500 | 10500 | 13000 | 19000 | 115 |
| 4 | 70 | 7800 | 10500 | 13000 | 19000 | 115 |
| Standard packing for Apex is | | 4" x 8⅛ lbs.<br>5" x 25 lbs.<br>7" x 50 lbs. | 4" x 12½ lbs.<br>6" x 25 lbs.<br>7½" x 25 lbs. | 5" x 12½ lbs.<br>6" x 50 lbs.<br>7½" x 50 lbs. | | 5" x 16⅔ lbs.<br>7" x 25 lbs.<br>8" x 50 lbs. |

Apex: Reg. U. S. Pat. Off.

**ATLAS EXPLOSIVES**

*"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

**ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco**

# TIGER BRAND has earned its service stripes

OUR ships, planes and mechanized fighting equipment have shown the world what American ingenuity can do when put to the test.

Wire rope, indispensable in the construction and operation of these implements of war, has taken on one unusual assignment after the other. Particularly is this true of American TIGER BRAND.

Not only have our engineers provided the fighting forces with TIGER BRAND to meet exacting requirements, but our shop forces, working around the clock, have turned out wire rope in quantities that would ordinarily have been thought impossible.

In making TIGER BRAND for war, we have learned two important things—how to turn out high quality wire rope fast, from new and better steels—and how to adapt it successfully to many new uses.

This hard-earned knowledge will insure top efficiency when you apply TIGER BRAND in domestic service. Today, a steadily growing amount of TIGER BRAND is becoming available for use here at home. So, when you need wire rope—and want the best—give us a call.

*Excellay Preformed*

**AMERICAN STEEL & WIRE COMPANY**
*Cleveland, Chicago and New York*
**COLUMBIA STEEL COMPANY**
*San Francisco*
United States Steel Export Company, New York

USS

**UNITED STATES STEEL**

# TYPICAL DIESEL LUBRICATION PROBLEMS:

## 3. Ring-Sticking

Ring-sticking usually results from deposits formed by the combination of the residues of oxidized lubrication oil and fuel with fuel soot.

In four separate ways, RPM DELO prevents the formation of these deposits:

1. RPM DELO is manufactured from a carefully selected base oil containing natural inhibitors highly resistant to oxygen. It contains no heavy residues which may be left behind to act as a binder for the fuel soot.

2. RPM DELO contains an added oxidation inhibitor which greatly reduces the rate at which the oil absorbs oxygen.

3. RPM DELO has chemical detergent properties. The compounding material reacts with the oxyacids to render them essentially inert so that they are no longer able to polymerize to form gums and lacquers.

4. RPM DELO has peptizing properties which enable it to maintain soot and oxidation products in suspension in minute particles. This prevents these materials from settling from the oil and forming engine deposits.

RPM DELO, moreover, is non-corrosive to all types of bearings, does not foam and has very high metal adhesion qualities at both high and low temperatures.

RPM DELO is marketed throughout the United States and many foreign countries under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial-RPM DELO (concentrate).

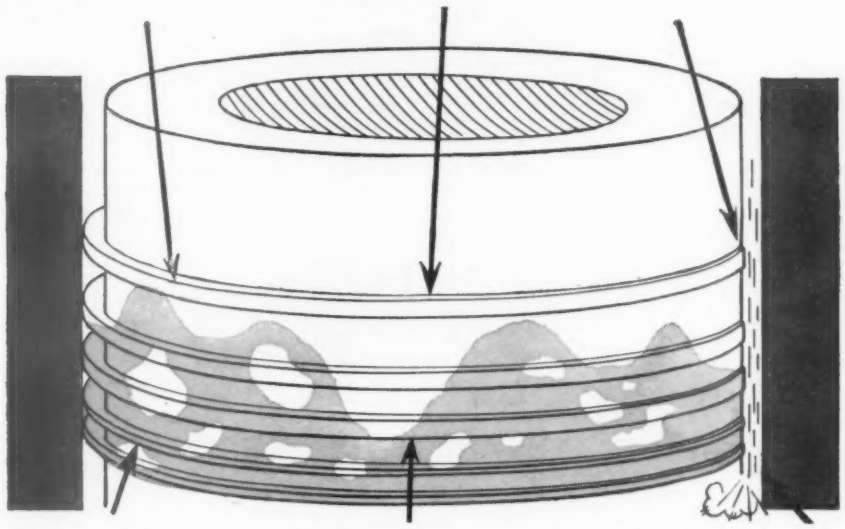
☆ ☆ ☆

### HOW RING-STICKING OCCURS

Decomposition products of fuel and lubricating oil deposit in ring groove, behind ring and in side-clearance space.

Rings stick in grooves, no longer expanding to form tight seal between piston and cylinder wall.

With seal broken, hot, high pressure gases "blow-by" stuck ring.



Escape of gases reduces compression, overheats piston, increases oil deterioration.

Blow-by pressure removes lubricating oil from rings and cylinder, leaving dry spots.

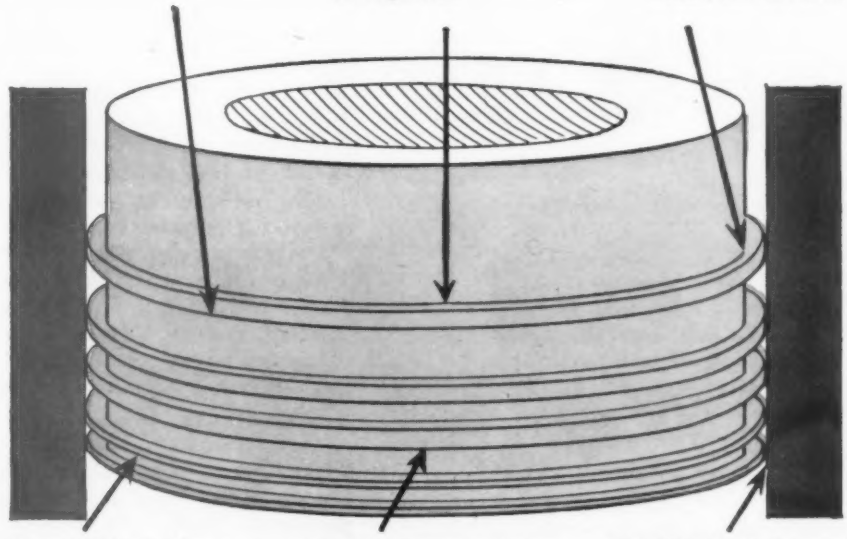
Lack of lubrication results in high ring and liner wear and scratching.

### HOW RPM DELO PREVENTS RING-STICKING

Detergent in RPM DELO prevents deposition of oxidation products.

Ring grooves are kept clear, allowing ring tension to maintain tight seal.

RPM DELO clings to ring surface, maintaining lubricant film and seal.



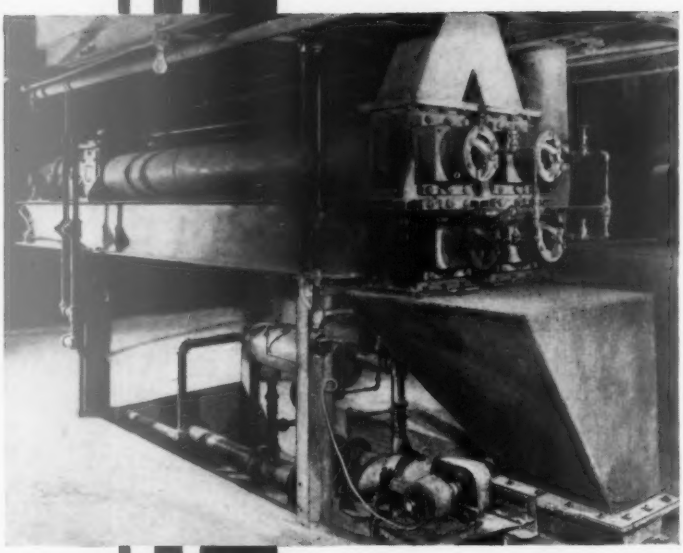
Tight seal eliminates blow-by, maintaining compression and power.

RPM DELO adheres to hot surfaces, protecting entire surface of rings, piston and liner.

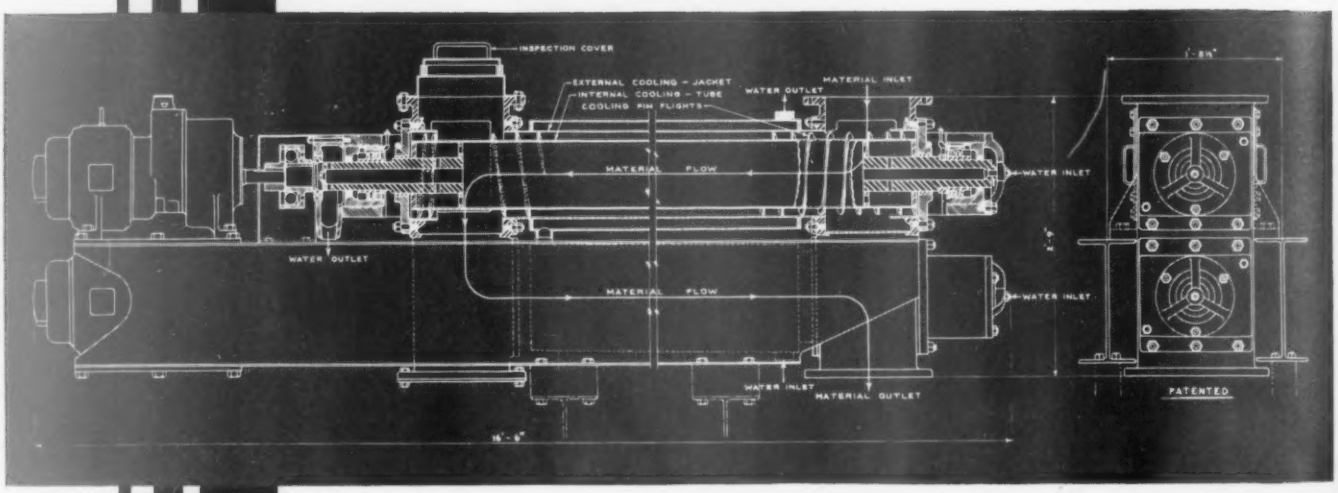
RPM DELO lubrication results in minimum ring and liner wear, eliminates scratching.

RPM DELO

**STANDARD OF CALIFORNIA**



# Efficient Cooling of Finished Portland Cement




**FULLER EQUIPMENT FOR THE CEMENT INDUSTRY**

Fuller-Kinyon Conveying Systems
Fuller-Fluxo Conveying System
The Airveyor Conveying System
Rotary Compressors and Vacuum Pumps
Air-Quenching Inclined-Grate Coolers
Dry Pulverized-Material Coolers
Rotary Feeders and Gate Valves
Material-Level Indicators
Slurry Valves
Samplers

The cooling of finished Portland cement has long been a problem in the cement industry and has increased in importance during the past few years. Most of the methods heretofore employed have been both expensive and inadequate, especially so in meeting present day requirements.

Always cognizant of the problems of the industry, Fuller Company developed and placed on the market the Fuller Dry Pulverized-Material Cooler, now installed and in use in several plants. The installation shown above, capacity 100 barrels cement per hour, is handling cement having a surface area as high as 2700.

Our engineering department is now in a position to make studies of your requirements. We'll be glad to work with you . . . why not look into this cooling problem now?

CC-2

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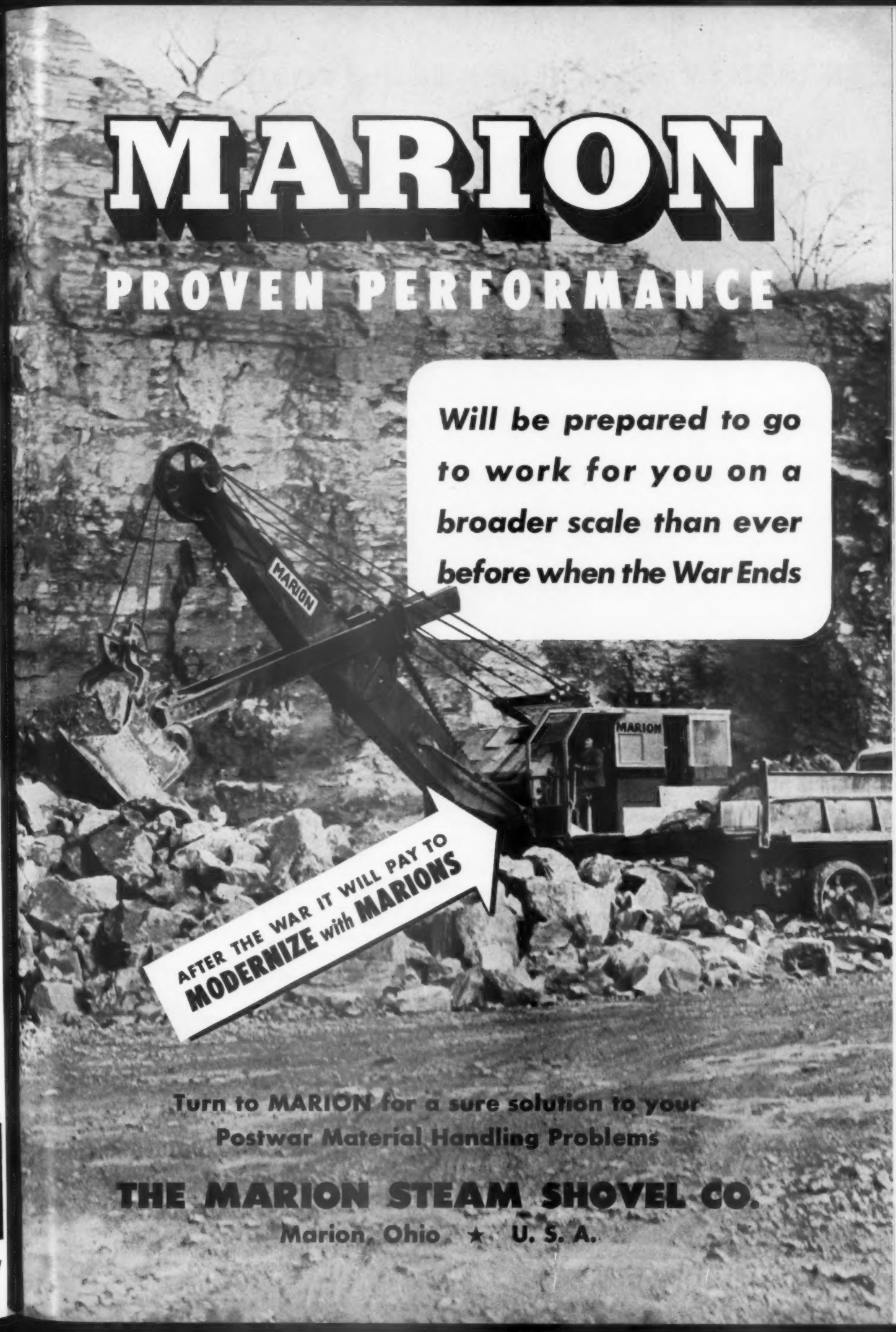
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PROVEN PERFORMANCE
Will be prepared to go to work for you on a broader scale than ever before when the War Ends
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AFTER THE WAR IT WILL PAY TO MODERNIZE with MARIONS
Turn to MARION for a sure solution to your Postwar Material Handling Problems
THE MARION STEAM SHOVEL CO.
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# ANSWER THIS SOS

## YOUR COUNTRY DESPERATELY NEEDS IDLE EQUIPMENT

Even with the greatly expanded construction equipment industry producing FOUR TIMES its pre-war rate . . . there is still a serious shortage of construction equipment. Nearly all new machines go directly to our armed forces overseas, even a large number of used outfits. As military operations expand, and additional territory is reclaimed from the Axis, more and more will be needed. Besides this — vital industries are in desperate need of tractors, graders, shovels, cranes and other units.

Here is a chance to actively support the war effort — rent or sell idle machines to essential users. Apply for authorization at your nearest WPB office . . . or make the deal through your Allis-Chalmers dealer. He will buy your equipment and see that it is directed into war work. No authorization is required on sales to dealers.

"Your equipment was not built to become a monument of idleness. It was built to do a job. Its use is constructive and every effort should be made to see that the maximum amount of good comes from its existence on the home front at this time. We cannot afford the luxury of idle equipment stored away and waiting for peacetime work".*

*H. M. Hale, Director of WPB Construction Machinery Division, Equipment Bureau.

**TAX RELIEF!**

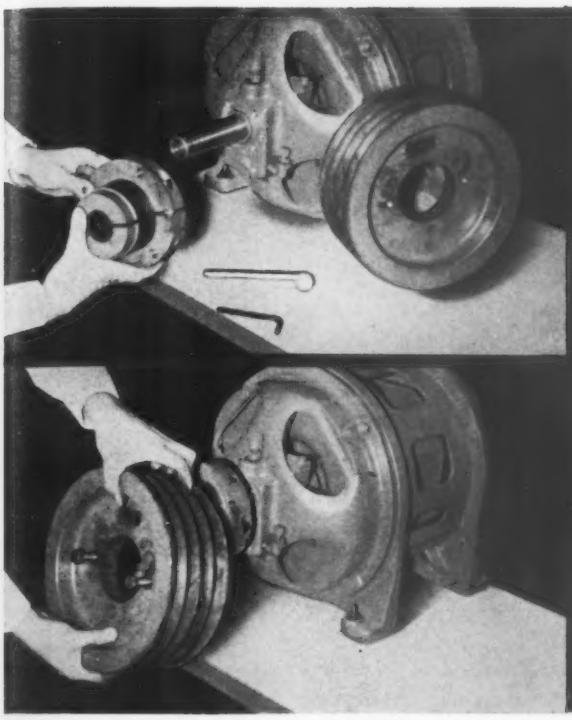
Special tax relief benefits are obtained on the gain from the sale of used construction equipment. Get all the facts from your Collector of Internal Revenue.

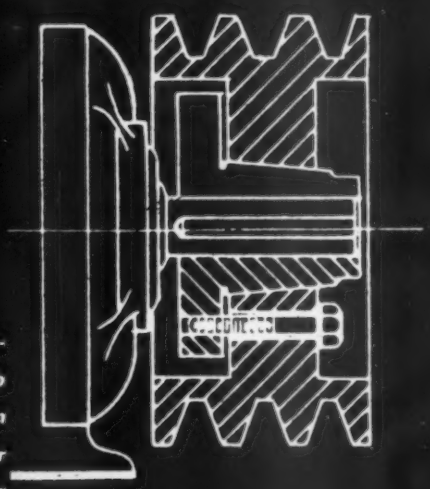
• • •

★ Buy War Bonds
★ Save Waste Paper
★ Turn In Scrap Metal
★ Be A Blood Donor
★ Pay Only Ceiling Prices .

**ALLIS-CHALMERS**
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

# NO OTHER SHEAVE HAS THESE 3 ADVANTAGES





*Split hub makes installation easy. Hub stays put—only rim is changed. Bigger pull-up bolts—higher taper cone pressure.*

## *Worthington's QD Sheave is easy to get on, easy to get off, yet always tight on the shaft*

If you have ever been in the shop when old-fashioned sheaves were being changed . . . saw workmen sledging and prying and sweating to get one off and another on . . . got an earful of loose fits, tight fits, misalignment, then you'll appreciate these advantages of Worthington's QD sheaves.

With the QD, the hub stays put, because a variety of sizes of rims fit it. When changes are made for different speeds, the rim is easily removed and replaced. On all other sheaves, the hub has to be loosened, presenting a realignment problem when the hub is drawn up to the rim. Once you put on the hub of the QD sheave, alignment problems are permanently solved.

These advantages, plus those of the Worthington-Goodyear Endless Cord V-Belts, make the Worthington Multi-V-Drive the most trouble-free method of driving by V-belts.

Stock size sheaves and belts are available at strategic centers throughout the country.

**SELECT A MULTI-V-DRIVE THE WORTHINGTON WAY with this simplified, easy to handle Master Manual**

You can select the right drive to fit your job exactly in three minutes by the watch—using just plain everyday arithmetic.

Scientifically evaluated, after years of laboratory tests, all factors affecting V-Belt life and V-Belt efficiency were taken into consideration so that each selection is guaranteed to give peak performance under all conditions for which it is recommended.

This 72 page indexed manual does your Multi-V-Drive engineering for you. Be sure to get your personal copy.

Mail in the coupon below now.

MV4-11

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# DRILLING to take out the toe!

*Drilling a snake hole with the DR30*

CLEVELAND DR30 Wagon Drills, in addition to having plenty of speed and stamina, are also remarkably maneuverable. They drill readily in any position and at any angle—straight down, flat, breast high, higher than your head, or within 4″ of ground level—even straight up when necessary.

The DR30 has a recoil device to increase cutting speed. The forward leg point steadies the drill. Other important features include a handy centralizer to keep the steel from "walking" while starting a hole. Also a double-screw jack for moving the U-bar. With a feed capacity of more than 8 feet, the DR30 handles depths to 25 feet and more.

Bulletin 132, sent upon request, explains why the DR30 is the most popular wagon drill ever built.

**BRANCH OFFICES**

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*BUY U. S. WAR BONDS AND STAMPS*

## THE CLEVELAND ROCK DRILL COMPANY

*Division of The Cleveland Pneumatic Tool Company*

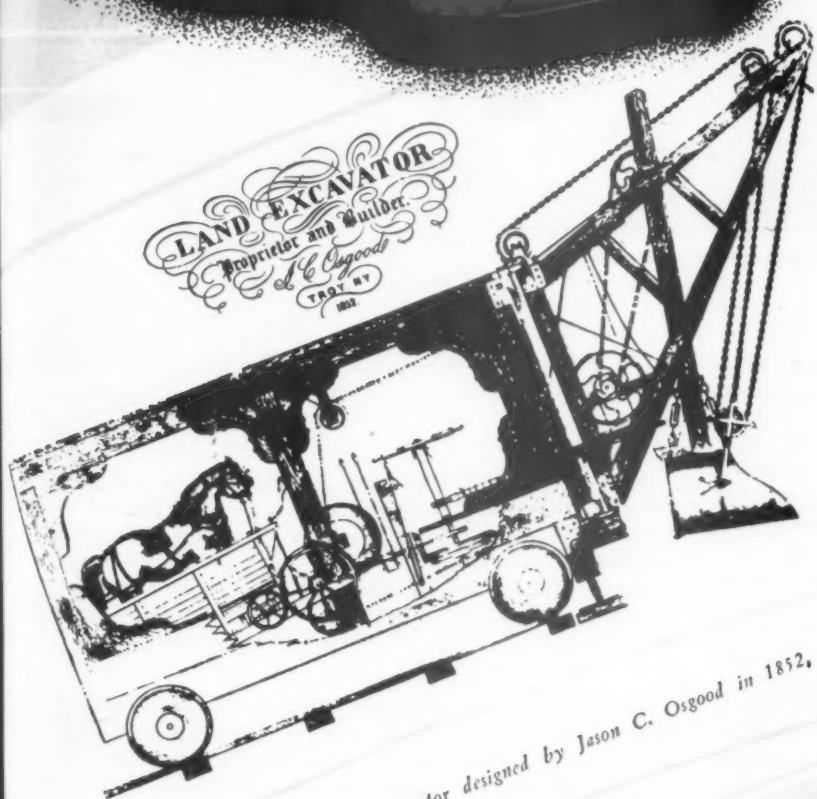
**CABLE ADDRESS: "ROCKDRILL" • CLEVELAND 5, OHIO**

**LEADERS IN DRILLING EQUIPMENT**

# Power...

## precedes progress

**Excavating earth a century ago was a job that taxed the ingenuity of experts. The missing factor in equipment, otherwise fairly efficient, was modern power. Today you can have the finest, most efficient, economical power ever developed by specifying BUDA Diesels.**




*Two-Horse power Excavator designed by Jason C. Osgood in 1852.*

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**Service is Nation-wide**

***Write or wire for literature.***

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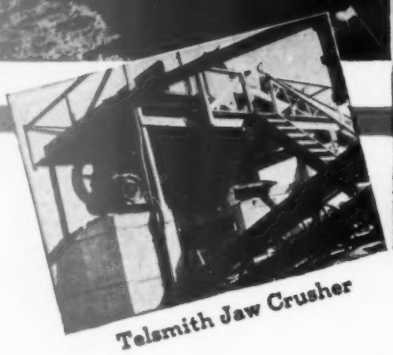
**HARVEY** (Chicago Suburb) **ILLINOIS**

# TELSMITH
## GRAVEL PLANT
## *serving urgent war jobs*



Telsmith Jaw Crusher

Telsmith Sand Tanks

Telsmith Gyrasphere

★ Urgent war projects near Pawtucket, R. I. demand large amounts of concrete aggregate. Owned by McHale Bros., the recently built Telsmith-equipped River Sand & Gravel Co. plant at Seekonk, Mass., turns out 180 tons per hour producing minus 1½" sand and gravel. 40% of total product is sand.

A 1¼ cu. yd. shovel and two end dump trucks feed raw bank run gravel into an 8 cu. yd. hopper having a railroad rail grizzly that rejects the few oversize boulders. A 30" x 5'6" Telsmith Reciprocating Plate Feeder feeds material out of hopper and over a No. 450 Telsmith Rotary Grizzly with 3¼" spaces. Plus 3¼" goes to an 18 x 30 Telsmith Roller Bearing Jaw Crusher. A 30" x 73' belt conveyor takes minus 3¼" direct from the grizzly, and from the jaw crusher, to a 4' x 10' Telsmith Single Deck Pulsator. Plus 1½" from this scalping screen goes into a No. 36 Telsmith Gyrasphere Crusher; and when crushed returns to the 30" primary conveyor via an 18"x48'6" conveyor.

Minus 1½" from the scalping screen goes via a 24" x 186'6" finished product conveyor to a 5' x 12' Telsmith 2-Deck Pulsator for washing and sizing. Sand is flumed to two No. 8 Telsmith Sand Tanks on a tower independent of main plant. The two sizes of gravel are deposited in two 20' diam. concrete-block silo bins, fitted with bin gates for loading into trucks.

Why do so many operators with war construction jobs depend on Telsmith? Because Telsmith equipment can be pushed to *top speed* and *will produce*. Telsmith Engineers' plant planning is sound. Telsmith Service is fast. *Get Bulletin G-15.* G-10R

**SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN**

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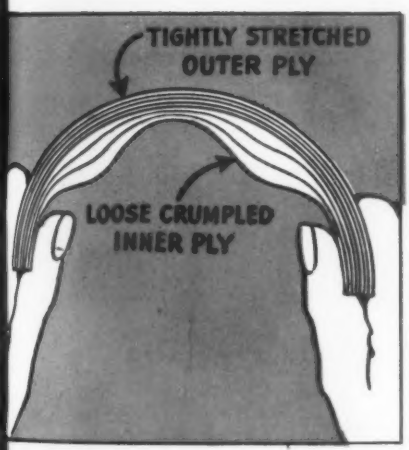
# COMPENSATION PRINCIPLE

## —with its fatigue-relieving Strength Members—
### gives you longer belt life, more power at the Point of Production




Try this yourself to illustrate what happens when your belts lack Compensation. A pad of paper, held firmly and bent has buckling sheets on the inside of the curve. This shows lack of equal tensions and illustrates why the plies of conventional belt "bootleg."

The Compensation Principle makes every ply work under equal stress—and prolongs the life of belts made from today's synthetic rubbers. You no longer need penalize your production by constant alternating of "stretch and buckle" stresses which, in ordinary belt, cause ply rupture as the belt goes round the pulley. Look at the diagram below which illustrates the difference between ordinary belt and Compensated Belt behavior under curve load. Note how Compensation—a patented and exclusive MANHATTAN development—*equalizes ply stresses*, prevents these destructive alternations of "stretch and buckle." Note how smoothly and uniformly the Compensated plies flex around the curve—providing fatigue relief for "war" rubber.

The amazing service you get is the result of MANHATTAN'S specially designed Strength Members so laid in FLEXLASTICS* that you get a truly Compensated Construction—flexible, longer-lived, with high overload capacity and capable of running over smaller pulleys without danger of ply separation or rupture of outside plies.

This principle of Compensation was developed for Condor Compensated Transmission Belt but is now also incorporated in MANHATTAN Conveyor Belts to increase service life where small end pulleys are used.

Users report 3 to 4 times longer fastener life. A paper mill reports a 9-year-old Compensated Belt "still performing like new." "100% more starting load capacity without appreciable belt slip," is still another comment.

Compensate yourself three ways—safeguard production, get longer belt life, increase power transmission efficiency with this revolutionary Compensation Principle in MANHATTAN Belts.

*The term FLEXLASTICS is a MANHATTAN Trade Mark. Only MANHATTAN can make FLEXLASTICS.*

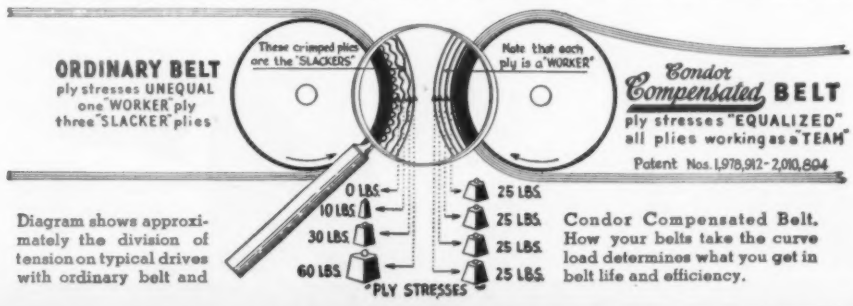



Diagram shows approximately the division of tension on typical drives with ordinary belt and Condor Compensated Belt. How your belts take the curve load determines what you get in belt life and efficiency.

BONDS—buy more to bring the boys down the home stretch.

KEEP AHEAD WITH MANHATTAN

THE MANHATTAN RUBBER MANUFACTURING DIVISION
of RAYBESTOS-MANHATTAN, INC.
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# Rock or Dirt

## DUMPED INSTANTANEOUSLY

**Time saved on the fill is time saved for every trip . . . more trips per hour . . . more production per shift. The Koehring Dumptor dumps any type material *instantaneously*. Seconds saved over mechanical dumping method speeds up every hauling and dumping job. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip.**

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**DEPEND ON YOUR KOEHRING DISTRIBUTOR** to help you keep your equipment operating. Care for your Koehring equipment **NOW**, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

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**HEAVY-DUTY CONSTRUCTION EQUIPMENT**

# AMERICA IS *Built with Aggregate!*

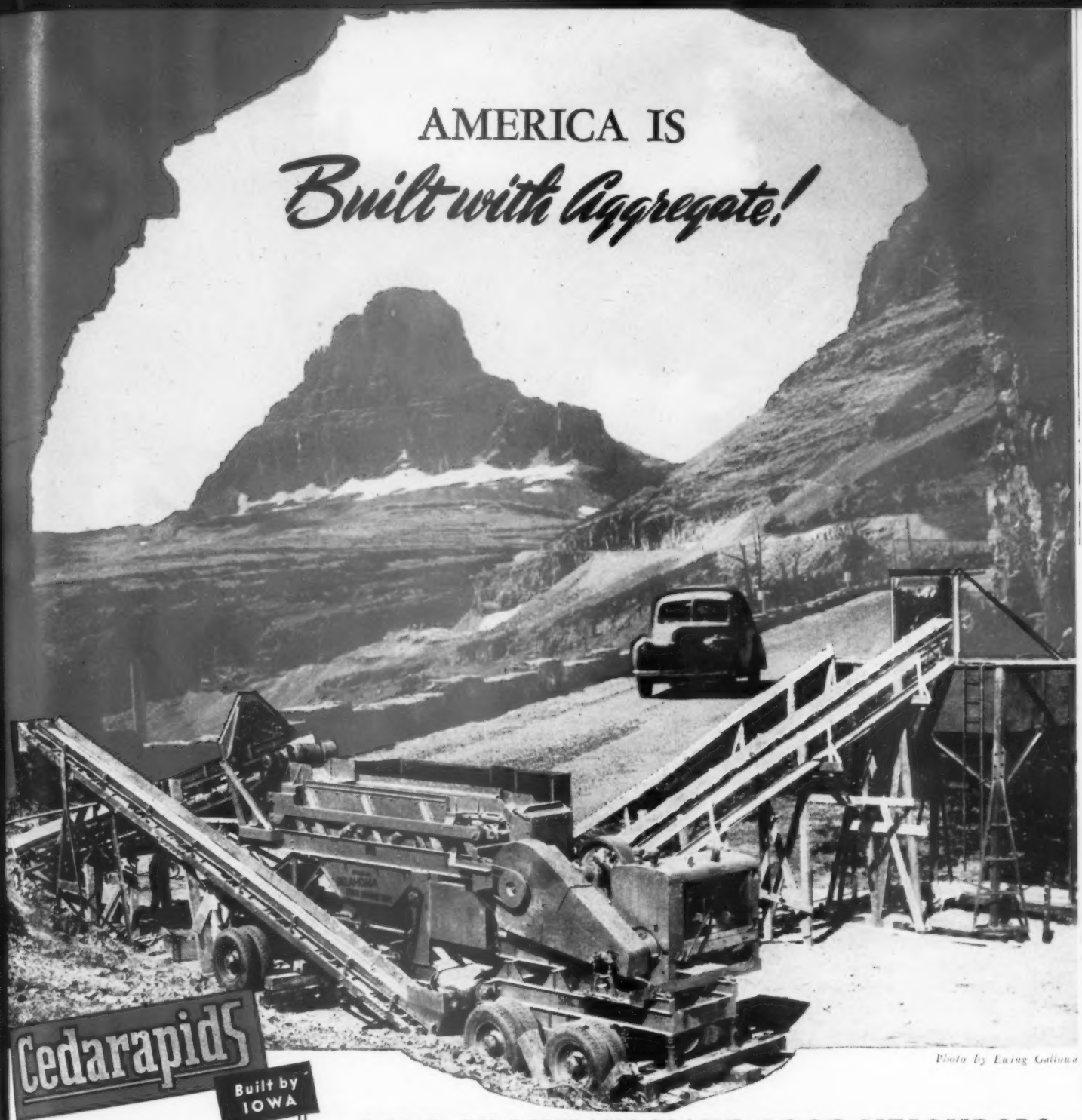

*Photo by Ewing Galloway*

Cedarapids

Built by IOWA

## THE IOWA LINE

*of Material Handling Equipment Includes*

ROCK AND GRAVEL CRUSHERS
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## GOOD HIGHWAYS MAKE GOOD NEIGHBORS

**Whether highways link nations together, like the Alaska Military Highway or Pan American Highways, or are the Farm to Market secondary roads, their primary object is to bring people and goods closer together. Good roads are built with aggregate, and, under the contract system of construction, are symbolic of the freedom of the American way.**

**More and more aggregate producers are finding that the production of low cost aggregates is the result of refinements in crushing equipment developed by the combination of construction "know how" and American ingenuity which produced the line of Cedarapids plants. The Iowa line ranges from single units to complete plants which can be engineered to meet any aggregate production problem.**

**Come to Iowa first, it's Headquarters for aggregate producing equipment!**

**IOWA MANUFACTURING COMPANY**
**CEDAR RAPIDS, IOWA**

# How We Harnessed a Magnet to Eliminate Wear

Where there is no mechanical contact between moving parts, no wear can take place. This is the principle which P&H uses to transmit power for hoisting the dipper of the new P&H Electric Shovel. . . . The *Magnetorque Drive* transmits torque by electro-magnetic forces rather than by mechanical contact. Designed specifically for Electric Shovel operation, it eliminates motor commutation problems, sliding gears, mechanical clutches and other complicated mechanisms. Reversing the hoist motor is no longer necessary. Hoisting is completely independent of all other operations.

The *Magnetorque Drive* is typical of the advanced engineering and simplicity embodied in every detail of the new P&H Electric Shovel. Write for full information about the new P&H Electric Shovels.

**P&H ELECTRIC SHOVELS**

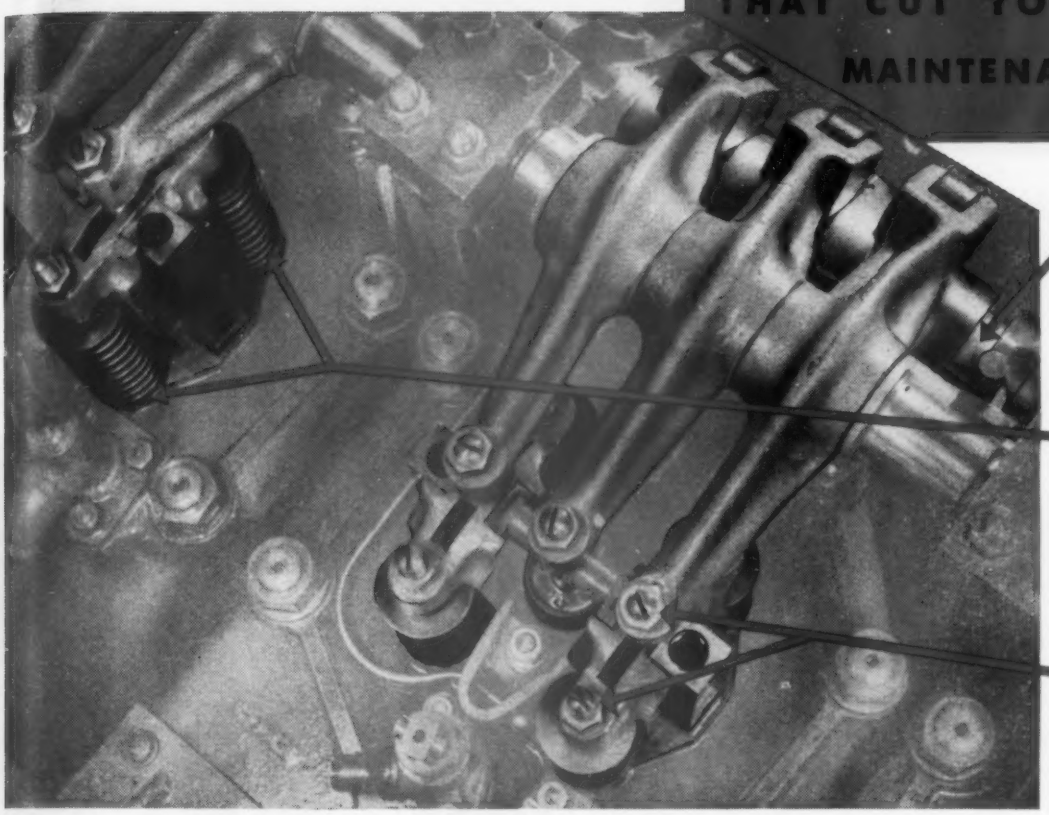
4451 W. National Ave.
MILWAUKEE 14, WISCONSIN

**HARNISCHFEGER CORPORATION**

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

# THREE HENDY FEATURES THAT CUT YOUR DIESEL MAINTENANCE COSTS



**1. OVERHEAD CAMSHAFT**

Reduces maintenance by eliminating parts and complicated linkage.

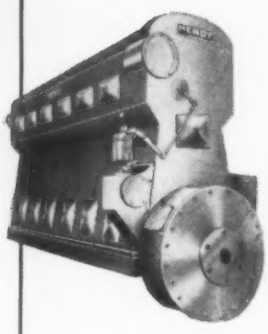
**2. DIRECT-ACTUATED DUAL VALVES**

Reduce maintenance by prolonging valve-stem and guide life.

**3. HYDRAULIC TAPPETS**

Reduce maintenance by eliminating manual tappet adjustment.

## HENDY SERIES 50 DIESELS



Hendy Diesels—6 or 8 cylinders, from 350 to 675 hp—are designed for marine and industrial use—or with Hendy generators, as complete electric generating plants.

Write today for complete data, ask for the new Hendy Series 50 Diesel Engine Catalog.

These three features of the Hendy Series 50 Diesel contribute directly to the lower maintenance costs a successful Diesel operator expects and must have.

The overhead camshaft eliminates the linkage of push-rods and valve-lifters for each cylinder—cutting maintenance by reducing the number of wear points. The valve mechanism, pressure-lubricated through hollow rocker-arm shafts, lasts longer because positive-acting cross heads, or dividers, assure even pressure on dual intake and exhaust valves and eliminate side thrust. Hydraulic tappets automatically maintain correct tappet clearance at all times, making manual adjustment unnecessary.

Any one of these features in a Diesel is an aid to lower maintenance costs. But the Hendy Diesel has all three. Even more, the Hendy Diesel has many other advantages never before combined in a single engine. Investigate the advantages of this modern Diesel today.

**JOSHUA HENDY IRON WORKS**

ESTABLISHED 1856

**SUNNYVALE, CALIFORNIA**

45-V

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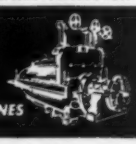
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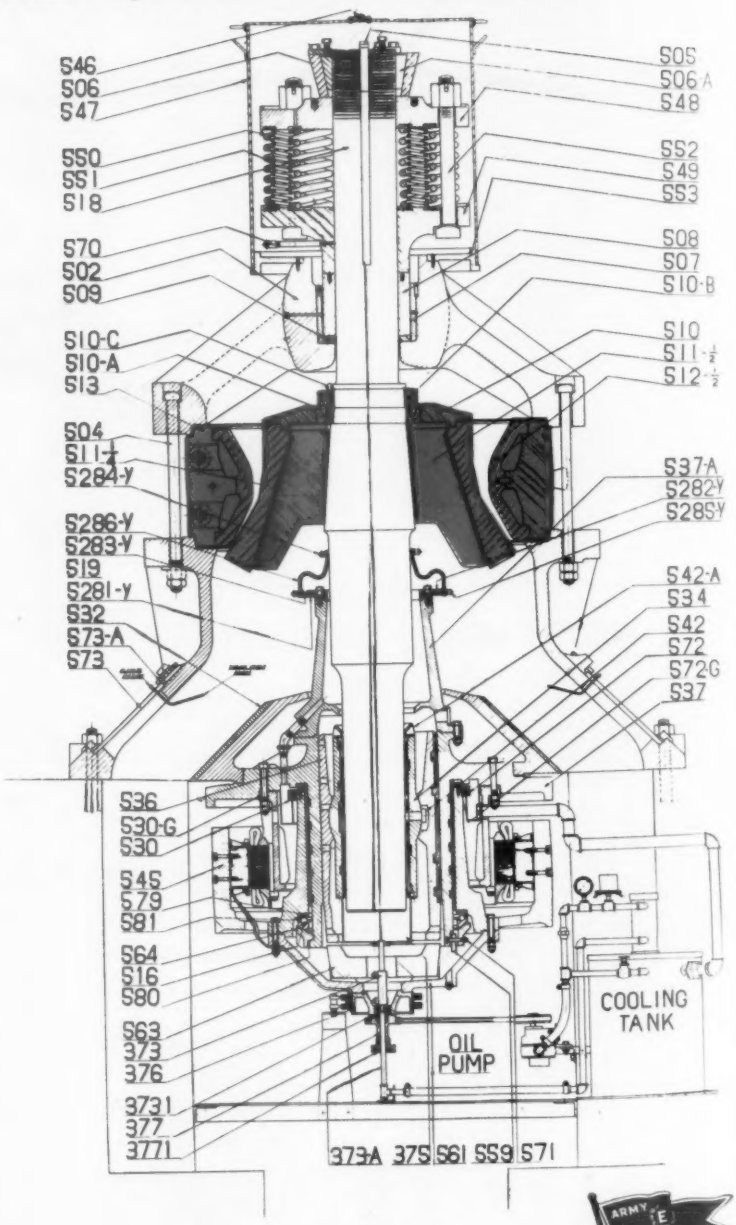


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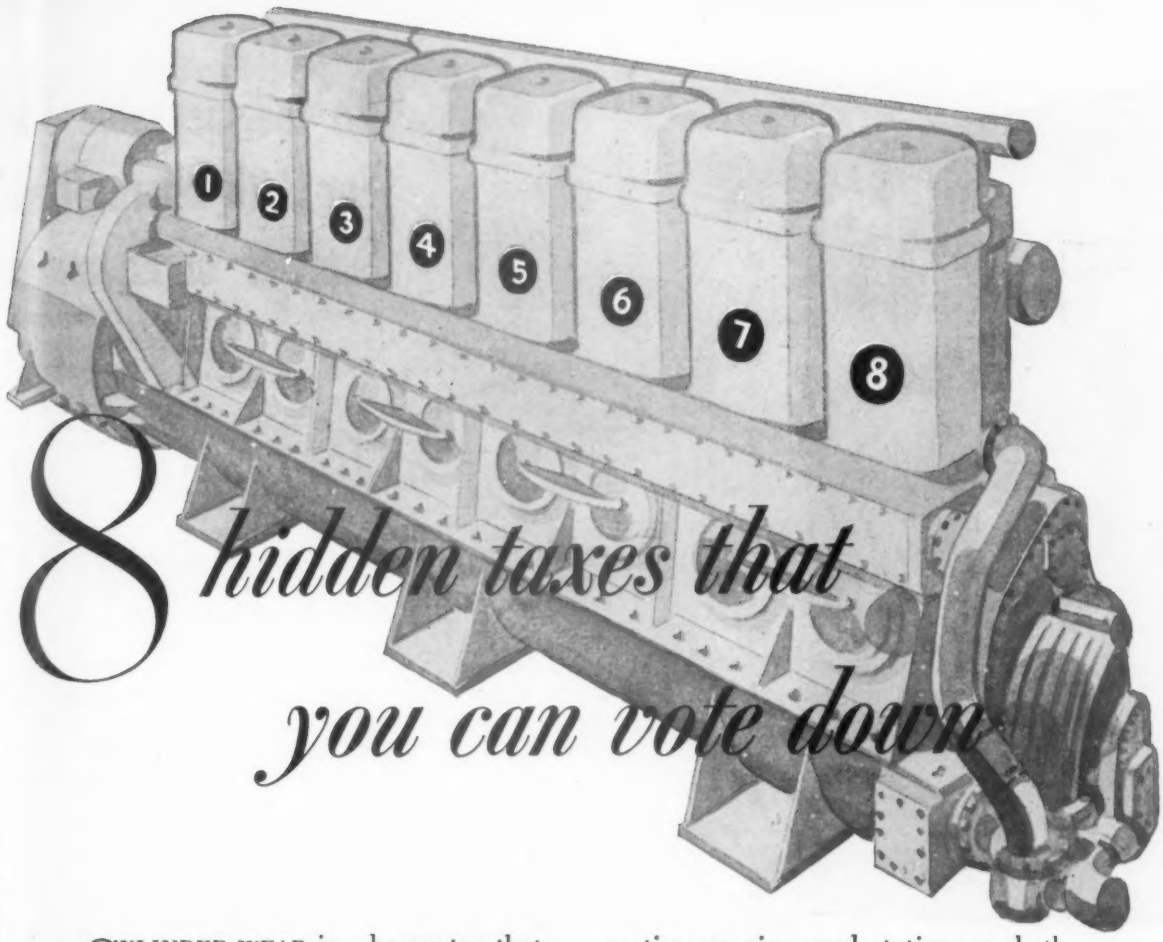


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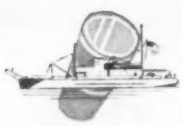

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PIT AND QUARRY

AUGUST, 1944

Vol. 37 No. 2

# CONTENTS

Editorial: The "Death" of Private Enterprise . . 32
News of the Industry . . 35
Washington News Letter . . 39
The Victory Program—and Your Business . . 40
A Granite Quarry in North Carolina . . 42
Thermal Expansion of Aggregates . . 43
Montana Quarry Supplies Flux Stone . . 46
Air Compressors—Part IV . . 48
Graphite Mill Reopened for World War II . . 52
New Puerto Rican Cement Plant . . 54
Taxation . . . a Year 'Round Operation Problem . . 63
Vertical Lime-Kiln Problems . . 64
Sensible Post-War Planning . . 66
High-Pressure Steam Curing . . 83
Gravel Producer Operates Ready-Mix Plant . . 84
Block Maker Installs High-Capacity Machine . . 85
ASTM Meeting . . 87

Personal Mention . . 68
After the War Is Over . . 69
Legal Decisions . . 71
Traffic News Digest . . 76
New Machinery and Supplies . . 79

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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# EDITORIAL

## *The "Death" of Private Enterprise*

THE end of the world has been predicted no more frequently nor with greater conviction than has the end of private enterprise, yet both continue to exist despite the dire forebodings of persons who appear to know no more about the one than of the other. The end of the world, if it should have one, will probably be brought about with a gradualness that must have characterized the beginning of the world, if it ever had one; under natural laws neither event could conceivably happen with cataclysmic suddenness. And so it was with the beginning of capitalism—more recently called private or "free" enterprise—and so will it be with the disappearance of that form of economic organization. No historian or economist worthy of the name would venture to point to any year of recorded history as having marked the beginning of private enterprise or capitalistic organization. Its origins lie so far back in preliterary history as to be beyond the reach of anything more factual than the imagination. Our descendants, either in this or some subsequent century, will have equal difficulty in defining the time at which capitalism may be said to have become transformed into something quite different. All types of economic organization—and private enterprise is but one of many forms—are the evolutionary outgrowth of determining conditions that went before and they may reasonably be expected to respond to changes in social thinking and so become altered under the influence of social progress.

It is not wise, therefore, to become greatly alarmed by the gloomy predictions of those who, in their enthusiasm for some proposed substitute for private enterprise, confidently and widely proclaim the inevitability of the death of capitalism. And by death they presumably do not mean a slow wasting away from numerous and scattered weaknesses and ailments, but rather a sudden end brought about by the quick accumulation of diseases of long standing, whose forces will all at once acquire the combined strength necessary to extinguish life in the wracked economic body. Needless to say, these predictions too often represent an expression of wishful thinking, a hope that the reforms recommended will be adopted and put into practice forthwith.

The failure of private enterprise in the past to prevent economic catastrophes, to provide high standards of living for all segments of society, to prevent the accumulation of the social wastes that have been so conspicuous in recent decades may have been due to lack of interest in such matters by persons engaged in private enterprise. It may have been due, as increasing numbers of economists and political scientists would have us believe, to the natural incompatibility of capitalism with widespread social justice and economic well-being, to the inherent anti-social tendencies that unrestricted free enterprise fosters and condones. The fact that capitalism has been characterized by repeated and increasingly tragic economic collapses and attendant widespread unemployment and misery is frequently cited as one of the natural weaknesses of the free-enterprise economy and as one of the most valid reasons for discarding it.

Two members of the Division of Research and Statistics of the Federal Reserve Board, E. A. Goldenweiser and Everett E. Hagen, writing in a recent number of the board's *Bulletin* under the title, "Jobs After the War," say in part:

"Maintenance of employment is the principal single economic objective that will have to be achieved if the existing economic system is to survive. It epitomizes most of the other economic aims that have to be accomplished. If activity after the war is kept at the rate necessary to give employment to substantially all employables, the goods produced will be sufficient to make it possible for all the people to maintain a reasonably high standard of living. The choice is between high production, high employment and general prosperity—and falling production, serious unemployment, widespread misery and danger to our institutions."

The authors go on to say that they offer no suggestion as to how that desirable end is to be achieved, yet many of their readers will read into these remarks a "do-this-or-else-ness" that will make them sound fearful indeed and full of the threat of impending calamity. It should be worthy of the attention of most of us whether reasonably full employment—in other words, employment of those physically and mentally employable—can not be achieved within the framework of a capitalistic economy, without the adoption of the extreme proposals of those who advocate scrapping it and substituting for it something devoid of individual economic incentive in the form of the profit motive. The patient, capitalism, may not be sick and diseased to the point of imminent death, as we are so often told, but merely inefficient to the point where working efficiency can be restored through the application of a regimen of somewhat limited diet and moderate exercise within the field of private gain, with social well-being as one of the ends, rather than one of the accidents, of its existence.

WE believe, and have often said, that the weaknesses and burdensome costs of present-day capitalistic organization can be corrected or removed without the abandonment of the organization itself, just as many of the evils of the old-style capitalistic economy have been eliminated without the destruction of the framework. As in the past, compromise will prove to be more effective in working out solutions of current problems than arbitrariness; something will be drawn from one form of proposed economy, something from another, while much of the existing economy will probably be retained. The result, what is often referred to as a mixed economy, will in its turn no more represent finality in our economic development than does the economy in which we live, but will constitute only another step in the progressive evolution of economic organization. There will be no sudden death, but the growth of one type into a higher, the passing of one phase into a later.

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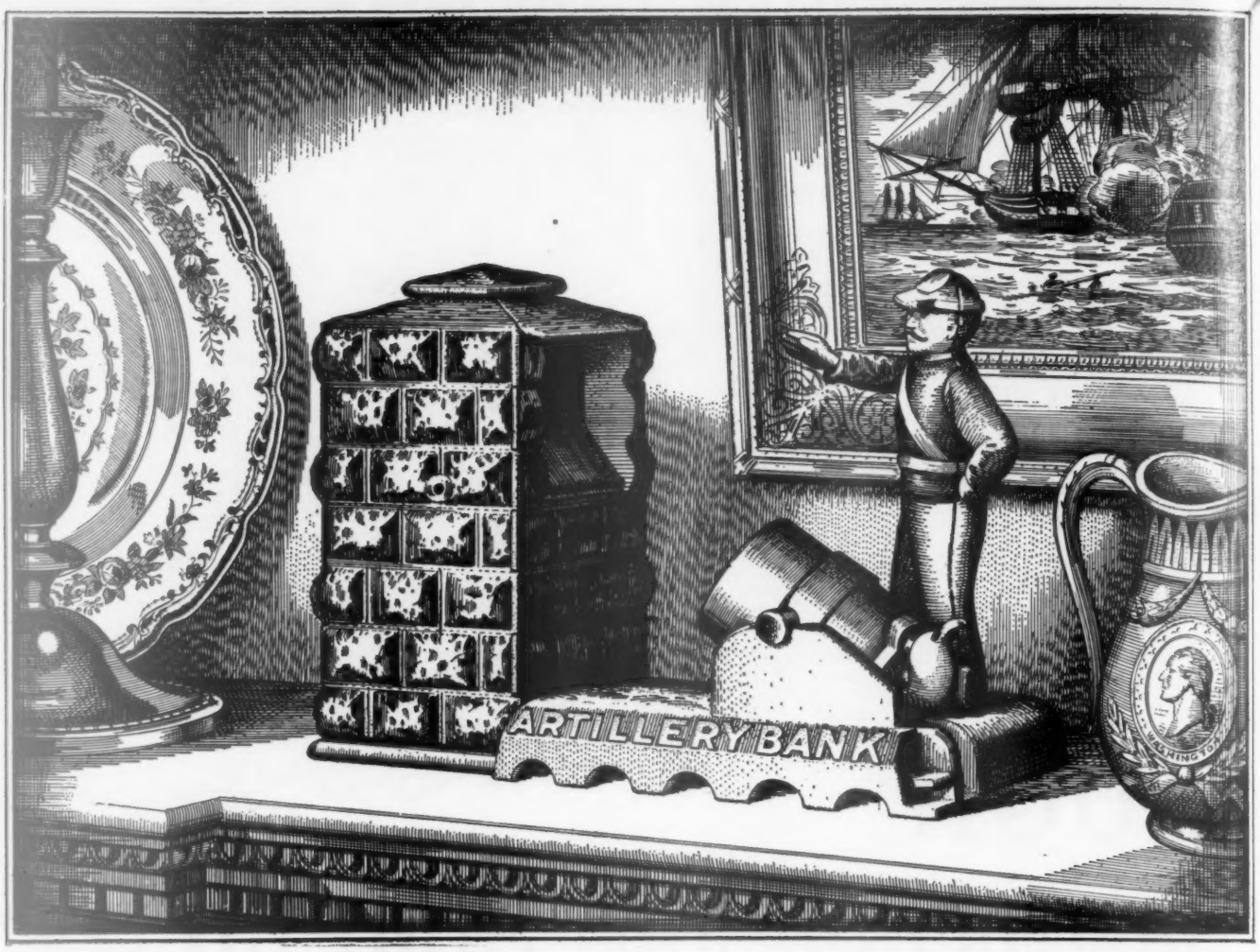


*Historic coin bank from an old New England collection*

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The early colonial was a stickler for thrift! Saving was made a game and banks like the one pictured here were a conspicuous part of every household. Ingeniously constructed they were, too, for they were made so that once the money was inside you could not take it out unless you broke the bank . . . and woe betide the one committing such a sin.

Thrift is playing its same important role in today's war and the pennies, dimes, and dollars of true Americans are shaping and powering mighty dreadnoughts, miracle Fortresses of the air and an endless stream of other Victory-making war material. Our country is dotted with hard-hitting production plants . . . monuments to the savings of each of us who, day after day, is helping to make America a better, a happier, and a safer place in which to live . . . savings that finance the war . . . with War Bonds.

War Bonds keep our Boys on the march . . . to Victory. Save for them. Start a family War Bond game in your home. Pool your pennies, nickels, dimes and dollars just as our forefathers did back in Revolutionary days. Set aside a specified time each week or month to turn this saved-up money into fighting War Bonds. Then, when the rainbow of Peace beautifies America's horizon, those dream things of tomorrow can be yours . . . they can be paid for with the War Bonds you buy today.

*A War Bond Message Designed and Contributed by Buell Engineering Company, Inc., New York*

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## W. E. Wing Elected New President of Marblehead Lime

W. E. Wing

Wallace E. Wing has been elected president of the Marblehead Lime Company. Mr. Wing holds a degree from the Department of Chemical Engineering of the Ohio State University, graduating in 1922.

Mr. Wing became associated with this company shortly after its reorganization in 1922, and has served in various operating, technical and executive capacities since that time. He has been active in the work of the C-7 Committee on lime in the American Society for Testing Materials and the American Chemical Society.

## Suspend Operations of Arkansas Silica Plant

Uncertainty of operation of the Missouri & Arkansas Railroad, its only railway outlet, and migration of employees to the harvest fields of Kansas where wages are reported at from $8 to $15 a day, has resulted in the temporary shutdown of the Silica Products Company, Inc., at Everton, Arkansas. The company also has a plant at Guion, Arkansas, which is operating.

The lull is being utilized to make repairs to equipment indicating that a permanent shutdown is not anticipated.

The plant normally grinds and washes several carloads of high-grade glass sand daily for glass factories and industrial plants in other states.

Mrs. Mertie A. Duncan, president, and her organization face a transportation problem if the M. & A. railroad, which has been having such serious labor troubles that the permanent suspension of service has been anticipated. Should service be discontinued a 12- to 15-mile truck haul to the nearest points on the White River Branch of the Missouri Pacific railroad would be necessary.

The Everton plant has a capacity of 30 tons and the operating Guion plant 50 tons an hour of silica sand. Ben F. DePriest is superintendent of the Everton plant. Some labor has been shifted to the Guion plant to raise production there.

## Coming Events

*August 15, 1944 — Chicago.* Semi-annual board meeting, National Ready Mixed Concrete Association, Palmer House.

*August 16, 1944 — Chicago.* Semi-annual board meeting, National Sand and Gravel Association, Palmer House.

*September 27-29, 1944—Boston.* Meeting, Industrial Minerals Division, American Institute of Mining and Metallurgical Engineers, Statler Hotel.

*January 23-25, 1945—New York.* 29th annual convention, National Sand and Gravel Association, Hotel New Yorker.

*January 24-26, 1945—New York.* 15th annual convention, National Ready Mixed Concrete Association, Hotel New Yorker.

*January 29-31, 1945—New York.* 28th annual convention, National Crushed Stone Association, Hotel New Yorker.

## Privately-Owned Construction Shows Rise in First Half

F. W. Dodge Corporation reports that the valuation of all construction contracts awarded in the thirty-seven states east of the Rocky Mountains during the first half of this year totalled $960,221,000, compared with a total of $1,851,272,000 for the first six months of last year.

While the total of all construction contracts was down considerably, privately-owned projects increased from $239,312,000 during the first six months of last year to $243,543,000 for the corresponding period of 1944. During the first half of last year privately-owned projects represented only 13 per cent. of the total contract awards, and this year they represented 25 per cent. of the dollar value of all construction.

A precipitous decline in government-financed residential construction was shown. Dodge's field reports show public contracts reached $72,299,000 during the first six months of this year compared with $310,909,000 in the first half of last year in the thirty-seven states.

Privately-owned residential construction let under contract in the January-June period this year amounted to $131,593,000, representing 65 per cent. of all residential construction in the thirty-seven states. During the first half of 1943, privately-owned residential construction represented only 35 per cent. of the total, the remainder being publicly owned housing.

Ownership of the Michigan Silica Company, operating at Rockwood, Michigan, has been acquired by the Owens-Illinois Glass Company, according to a recent announcement.

Edward J. Beyer, Detroit, continues as general manager under the new ownership.

## York Plant Wins '43 Lime Association Safety Competition

The York plant of the National Gypsum Company at York, Pennsylvania, has been named winner in the Bureau of Mines-National Lime Association safety competition of 1943 for working 302,951 man-hours during the year without a lost-time accident. Eight other plants, which also operated without a lost-time accident during the year but with fewer man-hours of exposure, likewise will receive certificates of honor from the association, according to W. W. Adams, chief, Accident Analysis Division, Bureau of Mines.

Statistics compiled by T. D. Lawrence and E. K. Elsner of the Accident Analysis Division showed that, in addition to the York plant, the following operations had perfect safety records in the 9th annual competition among lime association quarries:

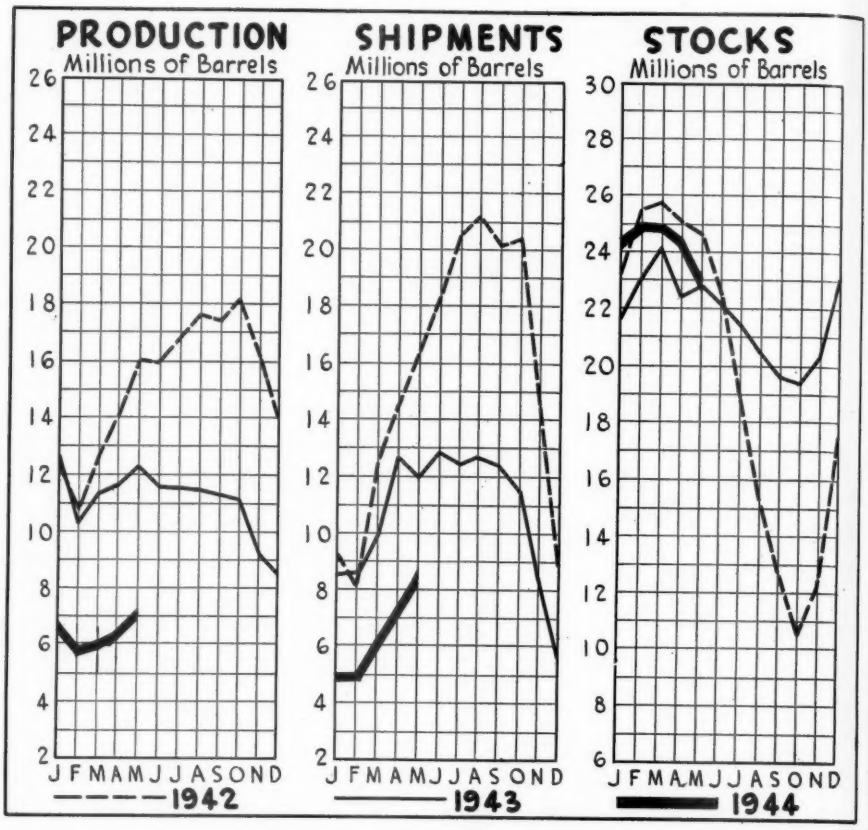
Kimbalton plant, Kimbalton Lime Company, Pearlsburg, Pennsylvania, 142,740 man-hours; Knoxville plant, Standard Lime & Stone Company, Knoxville, Tennessee, 121,499 man-hours; Wiooski plant, Champlain Valley Lime Company, Chittenden County, Vermont, 63,466 man-hours; Quincy plant, Marblehead Lime Company, Quincy, Illinois, 52,109 man-hours; Marblehead Lime Company, Marblehead, Illinois, 35,076 man-hours; Falls Village plant, United States Gypsum Company, Falls Village, Connecticut, 28,660 man-hours; Old Camp plant, Florida Lime Products Company, Ocala, Florida, 27,257 man-hours; and Houston plant, Nyotex Chemicals, Incorporated, Houston, Texas, 27,064 man-hours.

Evidencing the increased regard for safety by the industry, 61 plants in 22 states — the largest number ever enrolled—entered the 1943 competition and these plants worked a total of 11,120,508 man-hours, or more than five times the man-hours of exposure represented in the first contest in 1935.

Mr. Adams said the intense interest in accident prevention by the industry is more significant because of the man-power shortage and other perplexing problems which it faced in 1943 while turning out essential materials for the war.

For the York plant of the National Gypsum Company the first-place honors of 1943 represent a "repeat performance." This plant, which was enrolled in the first contest of 1935, took first place in the 1939 competition.

Although large quantities of explosives were used by the competing companies last year, not a single lost-time accident involving explosives occurred, statistics showed.



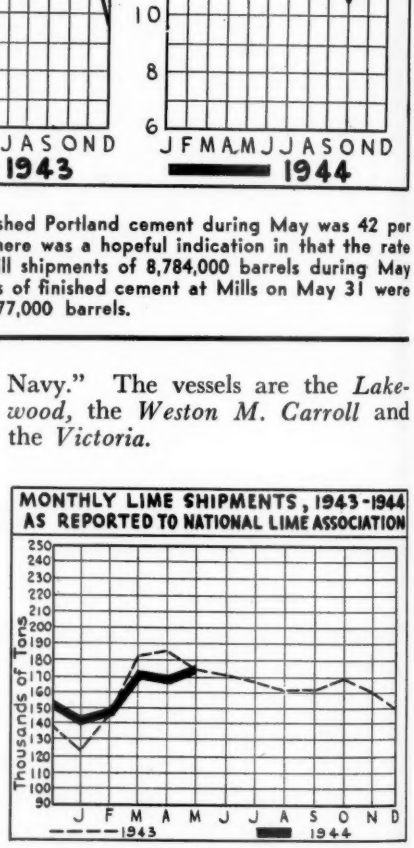

Although production of 7,181,000 barrels of finished Portland cement during May was 42 per cent. below the corresponding month of 1943, there was a hopeful indication in that the rate of decline was unchanged from last month. Mill shipments of 8,784,000 barrels during May were only 27 per cent. below May, 1943. Stocks of finished cement at Mills on May 31 were reduced to 22,477,000 barrels.

## Lake Sand Boats to Work for U. S. Navy

The R. C. Huffman Construction Company of Buffalo will purchase three sand-and-gravel boats from the Buffalo Gravel Corporation, President Robert C. Huffman, Jr. of the construction company has announced.

The vessels have been idle in Buffalo Harbor for more than a year because of the legislation banning dredging operations in New York State waters. The purchase price was not disclosed. They are now tied up at the dock of the Buffalo Gravel Corporation, undergoing work preparatory to leaving the Great Lakes.

Mr. Huffman said the three vessels will "leave Lake Erie for the coast some time this summer or early fall to be used in work for the Navy." The vessels are the *Lakewood*, the *Weston M. Carroll* and the *Victoria*.




According to data collected by the National Lime Association, 55 companies in May, 1944, shipped 176,968 tons of lime (106,024 quicklime; 70,944 hydrate). Reporting companies represent 41.6 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 450,000 tons. Shipments of lime by users for May, 1944, were:

| Use | Quicklime (tons) | Hydrate (tons) |
|---|---|---|
| Agricultural | 5,184 | 30,595 |
| Building | 8,094 | 17,181 |
| Chemical | 92,746 | 23,168 |
| Total | 106,024 | 70,944 |

## New 750,000-Barrel Cement Plant to Be Built at Memphis

The Missouri Portland Cement Company, St. Louis, has recently purchased a plant site in Memphis, consisting of 30 acres on North Thomas Street between the properties of the E. L. Bruce Company and the Chalfant Dock Company and has completed plans for the construction of a Portland-cement plant to be built as soon as War Production Board regulations permit.

The plant, which will be served by both the Missouri Pacific and Illinois Central Railroads, will be ultra-modern and will have an annual capacity of 750,000 barrels. Four types of cement will be manufactured: a standard Portland, a high-early-strength, a masonry, and a special concrete-products cement.

Since the principal raw material used in the manufacture of cement is limestone, and there being none available in the immediate vicinity of Memphis, the company's plans provide for the operation of a limestone quarry located on the Missouri Pacific Railroad near Batesville, Arkansas, to serve the proposed plant.

The Missouri Portland Cement Company now has cement plants in St. Louis and Kansas City, and the decision to build a plant in Memphis was reached after a thorough survey had been made of the market potentialities in the Mid-South and because of the company's desire to complete a triangle of service throughout the Mississippi Valley area.

Provided the War Production Board releases the equipment and material required to build the plant, it is expected to be in operation in time to serve the immediate post-war market, which officials of the company believe will be very active.

The Missouri Portland Cement Company has one of the most modern sand-and-gravel plants in the South located at 1600 Chelsea Avenue, Memphis, and has been active in the sand-and-gravel business in the Memphis area for forty years.

---

## Oregon Agstone Plant to Operate in August

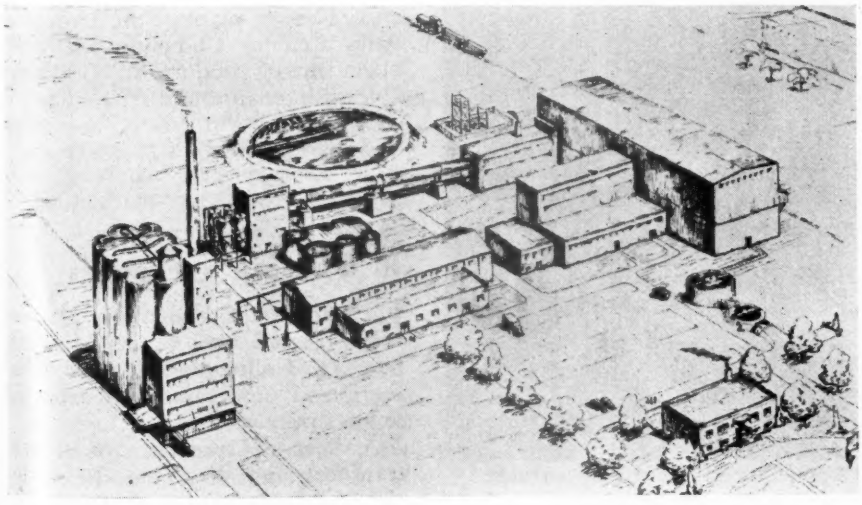
The Sullivan Lime Company is constructing a high-grade, low-cost agricultural - limestone plant at Rogue River, Oregon, according to an announcement by officials of the company. The plant will have a capacity of 300 tons per day, and the price of the agstone has already been fixed at $2.75 per ton in carload lots.

The ground limestone will be distributed from bunkers to be erected at various points in the Willamette Valley, and will be handled entirely through farm co-operatives in the vicinity. It is hoped that operations will start some time in August.

---

## Silica-Sand Plant Being Built at Eugene, Oregon

A $200,000 silica-sand treating plant, which will furnish molding sand to northwest foundries for steel castings, is under construction near Eugene, Oregon. The silica sand in this area is reported to rate as high in tests as sand shipped from Illinois. The plant will be operated by Silica Products, Ltd., of Portland, Oregon.



Artist's sketch of Missouri Portland Cement Company's proposed plant to be built at Memphis.

## Mexico Drops Tariff on Cement Imports to Ease Shortage

Sales of American Portland cement to Mexico are expected to soar as the result of the neighbor republic's decision to abolish tariff barriers formerly prevailing against the importation of this essential material.

The Mexican market has been thrown wide open to United States manufacturers in a special decree issued by President Avila Camacho. The chief executive explained his action on the ground that the Mexican "building industry is seriously affected by a cement shortage" which, he added, "can not be remedied within a short period by the production of this country."

The new border regulations permit the free importation of cement for purposes of public or private construction as well as for resale by local dealers. In the latter case, however, the decree provides that the price within the country must not exceed a ceiling determined by the Mexican Ministry of National Economy.

A condensation of its most important provisions follows:

I. The Ministry of the Treasury and Public Credit will authorize importation of Portland cement without duty provided that the interested parties present evidence issued by the Ministry of National Economy showing that they are:

(a) Holders of contracts for public works.

(b) Engineers, architects, or builders who will employ the cement in a predetermined project.

(c) Importers who will sell it at the price level fixed by the Ministry of the Treasury and Public Credit.

II. Persons or entities coming under classifications "a" and "b" of the foregoing clause who import cement without paying imports and who do not use it for the authorized work will be fined from 5,000 to 50,000 pesos.

III. Importers who sell the cement at prices above those set by the Ministry of the Treasury and Public Credit will be fined from 5,000 to 50,000 pesos.

IV. The exemption from duty will be suspended when the Ministry of National Economy considers that domestic factories are able to satisfy the necessity for this product and when conditions for its distribution have returned to normal.

## Sand-Gravel Output Down 23% Last Year, Says Bureau of Mines

After increasing almost continuously during the previous nine years, production of sand and gravel in 1943 declined 23 per cent. below the record established in 1942, according to figures released by the Bureau of Mines, United States Department of the Interior. As over 90 per cent. of the output of the sand-and-gravel industry is used in construction, many plants experienced drastic reductions in volume as projects in their vicinities were completed. On the other hand the industrial sands, having essential functions in a wide variety of manufacturing processes, attained a new record. Production of sand and gravel totaled 234,064,000 short tons valued at $152,793,000 in 1943 and 304,346,000 tons valued at $188,500,000 in 1942. Approximately 75 per cent. of the output was supplied by commercial plants and 25 per cent. by contractors and construction or highway maintenance crews employed by federal, state, county and municipal governments.

Commercial producers reported 176,469,256 tons in 1943, 24 per cent. less than the 232,947,787 tons sold in 1942. Average value increased from 68 to 72 cents per ton. Most of the output of the commercial plants is used in building and paving or as railroad ballast. This tonnage declined 27 per cent. from 211,687,165 tons in 1942 to 155,250,578 in 1943. The industrial sands all fared much better.

Aided by metal shortages, demand for glass containers was higher than ever, and glass-sand sales increased 10 per cent. to 3,971,931 tons averaging $1.86 per ton in 1943. Leading producing states, in the order named, were West Virginia, Illinois, Pennsylvania, New Jersey, and Missouri.

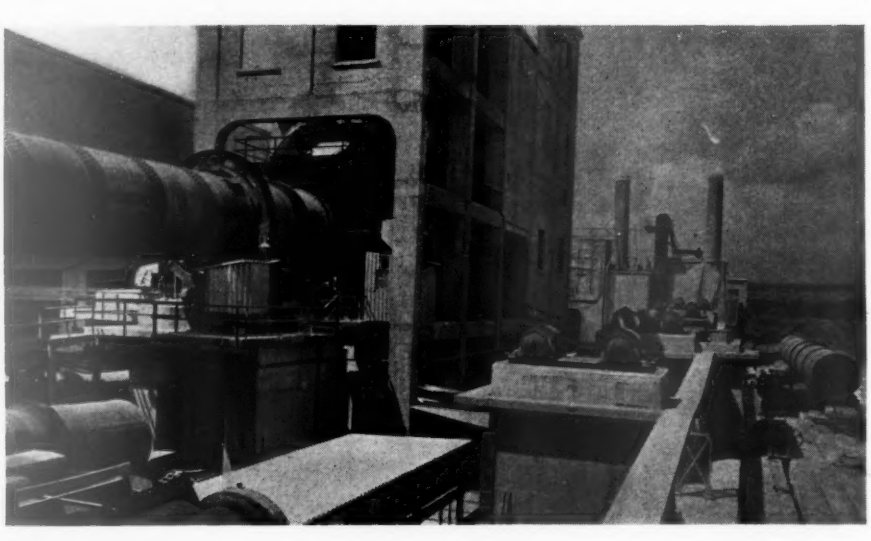
Although improvements in foundry practice are tending to reduce the percentage of new sand required, record tonnages of molding sand were used by the metal-working industries in 1943. Increasing 8 per cent. in tonnage, the output of molding sand was 8,924,654 tons averaging $1.36 per ton (8,255,991 tons valued at $1.30 a ton in 1942). Illinois, New Jersey, Michigan, Ohio, and Pennsylvania were the leading producing States.

Production of grinding and polishing sand (including blast sand) increased 4 per cent., totaling 837,662 tons valued at $1.71 a ton compared with 806,878 tons valued at $1.69 in 1942. Illinois, Michigan, Pennsylvania, New Jersey, and Missouri led in production.

## Kansas Agstone Plant Nearing Completion

The Earl Minton quarry at Parsons, Kansas, will start producing agricultural limestone in the near future. The plant is complete except for the pulverizer, which is being shipped from Michigan.

Frank Traynor, vice-president of the Florida Portland Cement Company, Tampa, and W. M. Palmer, president of the Dixie Lime Products Company, Ocala, were re-elected vice-presidents of the Associated Industries of Florida at its recent annual meeting in Jacksonville, Florida.



A view showing the Mixcoac cement plant under construction near Mexico City. (Photo courtesy Allis-Chalmers).

## WLB Upholds Regional Boards in U. S. Gypsum Cases; Denies Review

The National War Labor Board on June 27 denied petitions of the U. S. Gypsum Company for review of directive orders of the First and Tenth Regional War Labor Boards covering employees in the company's plants at Los Angeles, and Charlestown, Massachusetts. Industry members dissented.

In the Charlestown case, which affects approximately 30 employees, the Boston Regional Board ordered a standard voluntary maintenance-of-membership clause with a 15-day escape period; a voluntary check-off; a one-cent per hour general wage increase under the Little Steel Formula and retroactive to June 26, 1943, the date the case was certified to the board.

That national board specified that the regional board's order of arbitration as the last step in the grievance procedure should cover only interpretations or applications of the contract.

In the Los Angeles case the national board upheld the San Francisco board's order directing a standard maintenance of membership with a 15-day escape period, voluntary revocable check-off, and the retroactive date of wage increases April 9, 1943, the certification date. Approximately 153 employees are affected.

The employees in both plants are represented by the United Mine Workers of America, District 50.

## Cement Plant Down for Repairs After Record Run

After a record run of 2½ years without a shutdown, the Independence, Kansas, plant of the Universal Atlas Cement Company has been taken out of production. Considerable maintenance and repair work is expected to begin shortly, according to Superintendent C. M. Carman.

## New Agstone Plant to Operate Spreaders

An agricultural-limestone plant is being erected near Crane, Missouri, by C. B. Cullor of Unionville, Missouri, and production was expected to get under way in July.

A fleet of spreader trucks will transport and distribute the material to farms within a 10- or 15-mile radius.

# WASHINGTON NEWS LETTER

## Releases for Civilian Production

WHILE most of the newspaper headlines during the past month were being devoted to news from the war theaters and the political conventions, several happenings of considerable consequence were recorded on the economic front in Washington. Perhaps the most important development concerns the W.P.B. orders — discussed on this page last month—relaxing restrictions on civilian production. The behind-the-secenes efforts of the Army and Navy to block these orders were brought out into the open with a public statement from the Joint Chiefs of Staff that the W.P.B. action would seriously interfere with war production. The opposition of the military services to any expansion of civilian production at this time was supported by the War Manpower Commission, which felt that the success of its new manpower control program would be endangered if the W.P.B. plan went into effect.

Donald Nelson, however, in spite of considerable opposition within his own organization, as well as from outside agencies, decided to battle this issue through to the White House. The result was a clear-cut victory for Mr. Nelson, and the only concession made to the military was to stagger the effective dates of the orders over a period of about a month. Restrictions on the use of aluminum and magnesium were lifted on July 15. At intervals of one week thereafter orders were to take effect permitting the manufacture of experimental models for post-war civilian products, and allowing manufacturers to place orders now for machine tools and equipment needed for reconversion purposes. The most controversial order of all was deferred until August 15. This is the one which provided for "spot authorizations" by local W.P.B. officers of applications for the expansion of civilian production wherever a check of the local man-power situation indicated that this could be done without imperilling war-production schedules.

Another important development during the month was the enactment of the Contract Settlement Act of 1944, just before the Congress recessed. The act, which is the first legislative step in the program for gradual reconversion of American industry, establishes a formula for settling terminated war contracts. Several attempts were made, before the bill's passage, to incorporate various other provisions necessary to complete the program from a legislative point of view, including sections on the disposal of surplus goods and property and unemployment compensation for displaced war workers. However, in view of the fact that the George Committee of the Senate on Post-War Economic Policy and Planning is still studying various suggested proposals for handling these other questions, the contract-settlement plan was put through separately. In the form in which it was passed the act provides for the creation of an Office of Contract Settlement, headed by a director, and a ten-man advisory board on which are also represented the following: The War, Navy, and Treasury Secretaries; the heads of the Reconstruction Finance Corporation, War Production Board, Smaller War Plants Corporation, Maritime Commission, Federal Economic Administration; and the Attorney General.

The principal function of this office will be to insure uniform administration of government contract-termination policies. Under the settlement formula established by the act, the procurement agencies are to make part payment of claims submitted by both prime contractors and subcontractors pending final settlement. The role of the General Accounting Office, heatedly debated in the Congress for some time, is to be confined to reviewing payments after settlement to determine whether they were made in accordance with agreements, and whether they were induced in any way by fraud; there is to be no G.A.O. audit of all contracts before settlement. Contractors, however, are required to preserve their records for at least five years after final settlement or until after the conclusion of hostilities, whichever period is longer. Finally, the act provides for the prompt removal of termination inventories from the property of war contractors, in order to facilitate the reconversion process; after 60 days the contractor is to have the right to remove and store such inventories at government risk and expense.

In the meantime there is a constantly developing tendency in Washington to prepare now for the problems we will face in peace time. The striking gains made on the war front, as well as reports of mounting internal dissension within enemy homelands, lend more and more credence to the possibility of a termination of the war, at least in the European phase, by the end of this year.

The recent international monetary and labor conferences held in this country are shortly to be followed by similar meetings on other aspects of international affairs.

## Vermiculite Sales Drop in '43; Value Increases

Sales of cleaned and screened vermiculite decreased from the all-time high of 57,848 tons in 1942 to 46,645 tons in 1943, but the value increased from $319,931 in 1942 to $471,595 in 1943, according to reports submitted by producers to the Bureau of Mines.

The decline in output was due chiefly to a landslide at the mine at Libby, Montana, operated by the Universal Zonolite Insulation Company of Chicago, the predominant producer, which curtailed production during the first half of the year. Other factors responsible for the decrease in production were manpower shortages at several mines, and curtailed requirements for light-weight aggregate because of a reduction in building construction during the year. The average value per ton of the mine product at Libby virtually doubled that of 1942, which accounts for the decided increase in total sales value.

Virtually all vermiculite that enters the domestic market is cleaned and screened at the mine; some is exfoliated by the producers, or it may be sold to a processor for exfoliation. Screened vermiculite was sold to processors at $8 to $12 a short ton, f.o.b. mine. The exfoliated material was quoted at 70 cents to $1.25 a bag—each bag containing 4 cubic feet weighing 25 pounds,—or $56 to $100 a short ton f.o.b. works. There is about 10 per cent. loss per ton between the raw material and the exfoliated product. Assuming an average value of $75 a ton for exfoliated vermiculite, the value of sales in 1943 would be approximately $3,250,000.

# *the* VICTORY *Program*

## . . . . . AND YOUR BUSINESS

**LIGHT TRUCKS.**—The Office of Defense Transportation on July 14 notified its 142 district offices scattered throughout the nation not to accept new applications for light motor trucks, after denial by the War Production Board of the O.D.T.'s request for resumption of light-truck production beginning with the first quarter of 1945. There is little likelihood of new light motor trucks being available for the nation's truck operators during the first quarter of 1945 as a result of this action on the request of the O.D.T. for a minimum program of light trucks for essential civilian needs.

In view of the extreme tightness of flat rolled steel products and the existing manpower shortages that are affecting the medium and heavy truck program as well as other highly urgent military programs, the W.P.B. Requirements Committee did not feel that it would be feasible to authorize the production of light trucks unless facilities and manpower were made available by cut-backs in these other urgent programs O.D.T. was advised.

A total of 41,000 light trucks for the first quarter of next year was, however, authorized by W.P.B. on a "suspended AA-3" basis. This does not constitute an authorization to produce until specifically validated by the W.P.B. at some later date. It permits planning for production, but not actual production. "Consequently," O.D.T. officials said, "the outlook for new light motor trucks in the first quarter of 1945 is indeed gloomy."

O.D.T. officials explained that there has been no production of light trucks since completion of the March 1942 schedules. Since March 9, 1942, the beginning of truck rationing, there have been approximately 28,000 light trucks available from the national pool of trucks for essential civilian uses. Ordinary peacetime production of trucks in this class averages 300,000 a year.

At the present time there are only 700 light trucks remaining in the national pool, of these only 300 are available for essential civilian uses, the remainder being "earmarked" for the War and Navy departments, Maritime Commission, FEA and other "government-exempt" agencies.

On August 7, next, all trucks remaining in the pool that have not been taken up by the various agencies holding authorized quotas against them will be transferred to a common pool available equally to all agencies. O.D.T. is hopeful that it can gain a few more light trucks for civilian use as a result of this action, it was said.

The exhaustion of the light truck pool and the lack of a production program at this time due to anticipated impact with essential military programs confronts many essential civilian operations, particularly agriculture, with a serious transportation problem, O.D.T. said. It is more imperative than ever that existing vehicles in this class be conserved and utilized to the fullest extent possible through the adoption of every known expedient.

**LUMBER.**— Over-all control of lumber was established June 23 by the War Production Board under L-335. This control affects all users of lumber, wholesale and retail distributors, and all but the very smallest saw mills. It affects the householders who use lumber for a shelf or a bookcase or for a new porch floor as well as the large industrial consumers who use lumber in the manufacture of shipping boxes and crates, ships and motor trucks, furniture, agricultural implements, and the almost countless other items for which lumber is used.

Order L-335 as amended is a complete revision of the original order issued in March, 1944. It sets up the procedures under which sawmills deliver lumber; distributors receive and deliver lumber, and all consumers receive lumber; and it also controls, through quarterly authorizations, the amount of lumber that large industrial consumers may receive.

The order is effective August 1, 1944. Until that date consumers will continue to receive lumber under existing orders. On August 1 the following orders now controlling the distribution and use of specific species will be revoked, W.P.B. officials said: M-361 (southern yellow pine); M-364 (restricted Hardwoods); L-218 (Douglas fir); and L-290 (western lumber). Order M-208, which assigns preference ratings for softwood lumber, will also be revoked. Other lumber and log orders will remain in effect.

The chief provisions of L-335 set forth: (1) how consumers are authorized to get their lumber; (2) how distributors are authorized to receive and deliver lumber; and (3) how sawmills deliver lumber.

Consumers are placed in four groups according to the quantities of lumber they use and the purpose for which they receive it:

*Class I Consumer.*—A person who has received an authorization on W.P.B. Form 3640 is a Class I consumer. L-335 as originally issued required that W.P.B. Form 3640 be filed by lumber consumers who expected that they would need 50,000 board feet or more of lumber in the second or third quarter, 1944 for all purposes except those specifically exempted. These applicants will be given authorization permitting them to receive specified amounts of lumber in the third quarter. A Class I consumer is required to file Form 3640 for subsequent quarters irrespective of the amount he needs, unless otherwise directed by the W.P.B. Lumber received by Class I consumers in July, 1944—that is, in the third quarter but before the effective date of L-335—will be charged against their third quarter quotas.

Any person who has not received an authorization on Form 3640, but who will need 50,000 board feet or more of lumber in any quarter, must file the application form for authorization. Upon receiving authorization he becomes a Class I consumer.

A Class I consumer must certify all purchase orders for lumber. If he has a rating for production material or a rating of AA-4 MRO or better for maintenance, repair or operating supplies he may place a certified and rated purchase order. If he has no preference rating or only a AA-5 MRO rating, his purchase order is certified but unrated.

*Class II Consumers.*—Three types of lumber users are designated as Class II consumers: (1) users who would be required to file Form 3640 except that they require less than 50,000 board feet of lumber per quarter; (2) consumers who need lumber for mining and smelting operations for which they have been assigned serial numbers under Order P-56, or for operations directly incident to the discovery, development or depletion of a petroleum pool as authorized by Petroleum Administrative Order 11, and (3) consumers who need lumber for construction jobs expressly authorized by the W.P.B. or other federal agencies which issue authorizations for construction.

Class II consumers need not file applications for W.P.B. authorization to receive lumber; they must place certified and rated purchase orders for lumber for which they have been assigned preference ratings. They may not place certified purchase orders for lumber for purposes for which no ratings have been assigned or for which they have AA-5 MRO ratings.

As members of the mining industry operate under P-56, all producers are regarded as Class II consumers under the provisions of paragraph (k) of L-335.

Producers with mine serial numbers needing lumber for maintenance, repair and operating supplies, must place a duly certified and rated purchase order, showing the AA-1, S-7, P-56 and the other endorsements on purchase orders required by P-56. No reports are necessary.

Producers without mine serial numbers using less than 50,000 board feet of lumber per calendar quarter are also Class II consumers. Such producers should place duly certified purchase orders, showing AA-5, S-7 and P-56 for lumber needed for maintenance, repair and operating supplies, coupled with the purchase order endorsement required under subparagraph (q) (1) of L-335, as given below. No reports are necessary.

Producers without mine serial numbers using 50,000 or more board feet of lumber in a calendar quarter must make application on Form WPB-3640, which is to be filed with the Mining Division at Washington.

The L-41 Order of the W.P.B. makes it unnecessary to obtain W.P.B. approval for "Construction on structures which are to be used directly in the discovery, development or depletion of mineral deposits; also maintenance work, repairs and minor capital additions given priorities assistance under Order P-56." Permission to undertake such construction is granted to all producers with or without mine serial numbers. If lumber is needed for construction projects falling within the limits of the L-41 definition, producers simply place a duly certified purchase order carrying the P-56 endorsement phraseology plus the endorsement set forth in subparagraph (q) (1) of L-335.

Ready-mixed concrete producers, if they require less than 50,000 board feet of lumber per calendar quarter for maintenance, repair and operating supplies (MRO), are also regarded as Class II consumers. They, too, must place a duly certified and rated purchase order for lumber requirements, showing their AA-2 rating under CMP Reg.-5. In addition thereto both aggregate producers and

ready-mixed-concrete manufacturers must provide the following certification required under subparagraph (q) (1) of L-335:

The undersigned consumer certifies to the supplier and to the War Production Board that this lumber, together with all other lumber for which he has requested delivery, does not exceed the amount he has been authorized by the War Production Board to receive under Order L-335, with the provisions of which he is familiar, and that the use of any rating shown on this order is authorized.

Consumer

By.....
Duly authorized official

Date.....

Farmers are in the third class and all other consumers in the fourth class. In the latter category are consumers who have no ratings or who have only AA-5 MRO ratings. These consumers place uncertified orders only with distributors. The amount of lumber they get is controlled by the amount that the distributors will be permitted to sell for such purposes by a direction to L-335.

*Ratings.*—The order does not assign any preference ratings. If a consumer has a rating to get production materials for a product, he may continue to use that rating to get lumber for that product. However, a AA-5 MRO rating for maintenance, repair or operating supplies may not be used to get lumber, and thus a person with only a AA-5 MRO rating places only unrated orders.

*Distributors.* — Distributors may buy from sawmills or other distributors on certified purchase orders for an amount of lumber that does not exceed their total accumulated certified orders received from customers under this Order. Distributors who were in business and who had inventories before May 1, 1944, may also buy for inventory. They must apply to the W.P.B. on W.P.B. Form 3813 for authorization to place certified but unrated orders with their suppliers for inventory supplies. Lumber so purchased, however, may be sold only on certified purchase orders except that which distributors will be permitted to sell for ordinary, small uses.

*Certifications.*—The certifications that must be used are given in L-335. These are (1) certifications for Class I and Class II consumers; (2) certifications used by distributors in extending customers' certified orders; and (3) certifications used by distributors in purchasing authorized lumber for inventory.

**WAR-AREA HOUSING.**— A limited program of housing construction to relieve housing shortages for resident war workers in congested war-production areas was announced jointly July 19 by the War Production Board and the National Housing Agency. Construction under the new program, to be designated as H-2 housing, will be in addition to housing construction now under way to meet the needs of essential in-migrant war workers. New starts under the in-migrant program, designated as H-1 housing, are declining in reflection of the increasing stabilization of war employment in many production areas and the consequent decrease in net in-migration of war labor, W.P.B. and N.H.A. officials said.

Current tentative forecasts indicate the starting of several thousand dwelling units under the new program during the remainder of this year, with a probable quarterly volume of approximately 25,000 units during 1945. This would be in addition to housing started under the in-migrant program or to relieve cases of individual hardship.

Requests for materials for H-2 housing will be included in the NHA's regular quarterly requests filed with the WPB. Actual allocations of materials for H-2 housing by the W.P.B. will be governed by the availability of materials. Forecasts of construction volume under the new program are therefore subject to revision either upward or downward in line with developments in the war economy, according to the two agencies.

The W.P.B.-N.H.A. announcement pointed out that severe housing congestion of a type that can not be relieved by the in-migrant program has developed in many war-production areas and is directly or indirectly impeding the war effort. This reflects the previous inability under war-time conditions to provide new housing to accommodate normal needs arising from new family formation and increasing family size, or to house in-migrant service workers or military families not eligible for war housing under the H-1 program. For the time being the H-2 program will be limited to war-production areas.

Housing produced under the H-2 program will be made available to essential war workers, but the requirement of in-migrancy will not apply.

Both privately-financed and publicly-financed construction will be eligible for consideration under the locality quotas to be established under the H-2 program. After such quotas are established, applications for priorities on privately financed construction may be filed with the appropriate field offices of the Federal Housing Administration, a constituent agency of the N.H.A. A limited amount of federal financial assistance for public housing projects is available in some war-production areas under loan contracts outstanding with local housing authorities for low-rent housing projects, the construction of which was suspected subsequent to the outbreak of war.

The sales prices of housing built under the H-2 program will be generally limited to a maximum of $6,000 and monthly shelter rentals to a maximum of $50, the same ceilings which are in force for H-1 housing for in-migrant workers. In a few exceptional areas, where high construction costs prohibit the production of priority housing to sell or rent at these levels, the N.H.A. is authorized to allow exceptions for sales prices up to $7,500 and rentals up to $62.50. The N.H.A. will also have authority to set upper limits on sales prices or rentals below the $6,000 and $50 ceilings in areas where building costs permit the construction of adequate housing at a cost below the maximum.

In administering the H-2 program, the N.H.A. will seek to secure as large a proportion of rental housing as possible. On larger local programs, involving more than 300 units, the N.H.A. and W.P.B. have agreed that the program initially will provide at least half of the units for rental. In developing smaller local programs, there will be more flexibility and the determination of how much rental housing is needed and can be produced will rest with the N.H.A.

**P-56 CHANGES.**— The Mine and Smelter Order P-56 has been amended as of July 4, 1944. The significant changes are as follows:

Section (b) (1) has been changed to read, " 'Producer' means a person operating any of the following enterprises, whether in the United States, or any of its territories, or in a foreign country, but does not include any enterprise defined as a 'non-essential' mine in Order L-208."

Section (e) (1) has been changed to read as follows: ". . . Such producers may apply for higher ratings for maintenance, repair, or operating supplies exclusive of minor capital additions by filing Form W.P.B.-2910 with the Mining Division of the War Production Board, Washington 25, D. C., Ref.: P-56; *and for higher ratings, or for specific authorization if such is required, for minor capital additions, such producers may apply on Form W.P.B.-1319 or any prescribed special application form, following the procedure specified for serialized producers in paragraph (c) (3), except that Form W.P.B.-1319 shall be filed with the War Production Board regional or district office in which is located the Technical Advisor for Mining for the area in which the enterprise is located, and only the special application form, when one is prescribed, shall be filed with the Mining Division in Washington, D. C. Such producers may apply for priorities assistance for machinery or equipment by filing Form W.P.B.-1319 or any prescribed special application form, following the procedure specified for serialized producers in paragraph (c) (3), with the Mining Division of the War Production Board, Washington 25, D. C., Ref.: P-56.*"

A few other minor changes have also been made.

## '43 Mineral Wool Production Up 8%

Mineral wool production in 1943 reached 551,524 short tons valued at $43,670,710, an increase of $10,863,802 in dollar value and approximately 33,000 tons over the 1942 total.

The Office of Price Administration on September 16, 1943, under Amendment 3 of Order A-2 of Maximum Price Regulation 188, provided for an adjustment in maximum prices of producers of mineral wool. The new provision permits the granting of relief to cover total manufacturing costs, where manufacturers are unable to maintain or expand production under existing maximum prices in areas where there is a general shortage and where operation of all plants in the area is necessary to prevent an increase in the price to the consumer. Prices in 1943 per short ton in carlots f.o.b. plant were $30 for loose and $45 for granulated wool.

Production in 1943 came from 40 companies operating 53 plants in 19 states compared with 41 companies operating 52 plants in 18 states in 1942, the first year for which statistics on mineral wool were collected by the Bureau of Mines. These plants utilized 12 types of raw material, which include slag, 47 companies; limestone 23; woolrock 13, shale 10; clay 8; silica rock 6; glass batch 5; gravel 2; and iron ore, wool rock slag, granite, and sandstone 1 each. Fuel used in all of these processes amounted to 137,286 tons of coal; 156,936 tons of coke; 1,977,372 gallons of oil; 1,572,681,674 cubic feet of gas, and 35,961,649 kilowatt hours of electricity.

# A GRANITE QUARRY IN NORTH CAROLINA

another ON THE SPOT report

ONE of the many small quarries scattered throughout the country which together make up a large percentage of the crushed-stone industry's output is that operated by the Piedmont Quarries Company at High Point, North Carolina. The deposit, with its hard and abrasive granite, had for years supplied much of the aggregate used in road and highway construction in its vicinity. It was taken over a few years ago by the present owners who rebuilt the plant and put it back in operation in March, 1942. Its present capacity of 150 tons in 9 hours will later be increased to 30 or 40 tons per hour by the installation of a larger primary crusher.

The overburden, averaging 4 feet in depth, is removed by a contractor using a power shovel. The quarry face now extends about 300 feet and has a maximum height of 55 feet. It is drilled in 18- to 20-foot benches by an Ingersoll Rand X70 tripod drill. A 60-per cent. explosive is used and this is detonated by a battery. Two Chicago Pneumatic jackhammers are used for blockholing and the secondary shots are fired by "Clover Brand" fuse. Air for these drills is supplied by a 12- by 14-inch Chicago Pnuematic compressor.

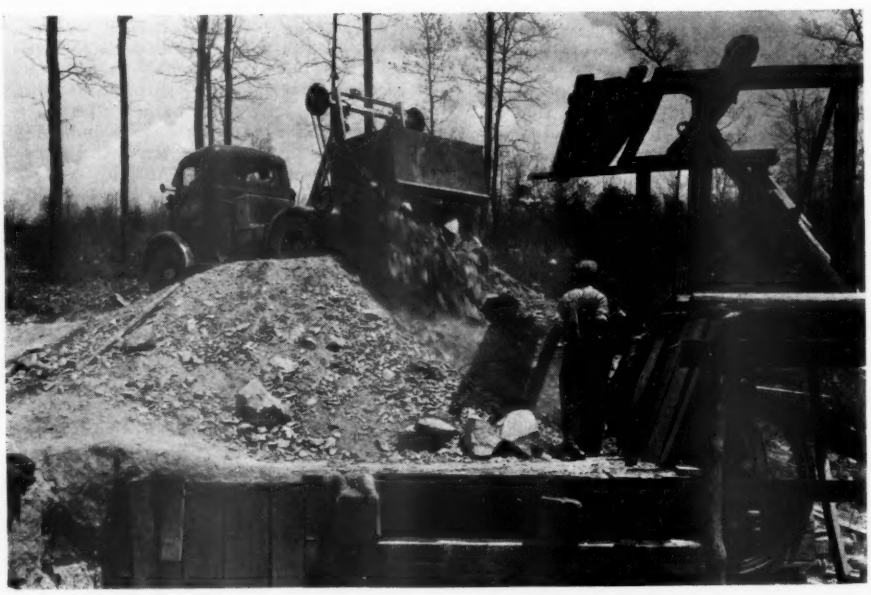
The stone is loaded by hand into the 2-cubic yard skips of a Dempster Dumpster which is mounted on a Mack truck chassis. This machine is an old model which has been used by the company for many years. Four men each load 2 buckets at the present low rate of production.

The Dumpster hauls the skips a distance of 200 feet to the plant where it dumps the stone into the 10- by 20-inch Buchanan jaw crusher. This is driven through a belt by an 85-horsepower Allis-Chalmers gas engine burning fuel oil. A 24-inch by 112-foot belt-conveyor carries the stone to a 3-foot Symons shorthead cone crusher. This is driven by a 65-horsepower electric motor. The product of the secondary crusher is carried on a 24-inch by 90-foot conveyor to a 3- by 10-foot, 3-deck Simplicity screen which does all the sizing. This screen has 1-, ½-, and ¼-inch cloth on its decks and the three sizes of stone and the screenings made are discharged into four of the six 25-ton wooden bins. The screenings are sold as stone sand. A Ford dump truck is used to make

(*Continued on page* 47)

The screening and crushing operations.

Truck picking up bucket at quarry face.



Bottom-dump bucket dumping into primary crusher.

# Bureau of Standards Studies Thermal Expansion of Aggregates

By WALTER H. JOHNSON and WILLARD H. PARSONS
National Bureau of Standards

● As a part of a study of the properties of concrete aggregates, thermal-expansion determinations were made on 137 specimens of aggregate materials and single crystals by the optical interferometer method over the temperature range -4 to +140 degrees F. The thermal expansivities of most aggregate materials are close to or within the range of expansivities of hardened Portland cements. Crystal orientation, rock texture, and irregular expansitity are discussed with regard to their effect on the thermal expansion of aggregate materials and their relation to the durability of concrete.

another P AND Q exclusive

AN examination of the available data shows that there is a lack of adequate information on the thermal-expansion characteristics of commercial concrete aggregate within the temperature range of natural weather conditions. The majority of investigators, furthermore, have assumed a more or less straight-line relationship between temperature and thermal expansion, without regard to possible irregularities during the large intervals between readings. Accordingly, as a part of a general study at the National Bureau of standards of the properties of aggregate materials, commercial aggregates from a number of sources were obtained and separated into fractions representing the various rock and mineral constituents of the aggregates. Coefficients of linear thermal expansion were then determined for these rocks and minerals over the temperature range of —4 to +140 degrees F. Although the expansion of most materials, when plotted against temperature, usually yields smooth curves, it will be shown that there are some glaring exceptions.

**Test Method and Materials** The interferometer method was used in conjunction with a thermal chamber that could be varied continuously between —4 and +140 degrees F. This enabled the use of small specimens, the measurement of low expansivities and the taking of frequent observations separated by small temperature intervals. The majority of the specimens were taken from ¾- to 1¼-inch gravel and were cut in a Y-shape with small projections on the tops and bottoms of each arm, the heights of these projections being carefully adjusted. A detailed description of the apparatus, of the preparation of specimens, and of the test procedure are given in another paper by the present authors. [1][1]

[1]Figures in brackets indicate the literature references at the end of this paper.

**Table I.—APPROXIMATE PERCENTAGES OF ROCK AND MINERAL FRACTIONS IN VARIOUS COMMERCIAL CONCRETE AGGREGATES.**

| Designations | Source of Aggregate (aggregates not labeled "gravel" are crushed stones) | Percentages of Rock and Mineral Fractions | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Chert | Quartz Pebbles | Unclassified Sandstones | Limonitic and Hematitic Sandstones | Clayey, Chloritic, and Micaceous Sandstones | Arkosic and Feldspathic Sandstones | Limestone | Dolomite | Quartzites (a) | Granite | Other Granitic Rocks (b) | Felsites: Dacite, Andesite, Trachyte | Basalt | Volcanic Breccia | Phyllite (in A) and Argillite | Schists and Gneisses | Greenstone | Miscellaneous Rock Types |
| A | Buck Dam, Va. | | | | | | | | | | | | | | | 100 | | | |
| B | Potomac River, Md.-Va. (gravel) | 11 | 30 | | 8 | 7 | | | | 39 (h) | 2 | | | | | | 3 | | |
| C | Silver Hill, Md. (gravel) | 17 | 50 | 15 | 1 | | | | | 17 | | | | | | | | | |
| D | Pt. Jefferson, N. Y. (glacial gravel) | | 80 | | | | | | | 7 | 5 | | | | | | 8 | | |
| E | Lyon Mt., N. Y. | | | | | | | | | | | 60 | | 35 | | | | | 5 |
| F | Norwood, N. Y. | | | | | | | | 100 | | | | | | | | | | |
| G | Jordanville, N. Y. | | | | | | | 100 | | | | | | | | | | | |
| H | N. LeRoy, N. Y. | 20 (c) | | | | | | 80 | | | | | | | | | | | |
| I | Mille Roche, Canada | | | | | | | 100 | | | | | | | | | | | |
| J | North Central Ohio | 95 (c) | | | | | | 5 | | | | | | | | | | | |
| K | Camden, Tenn. | 100 | | | | | | | | | | | | | | | | | |
| L | Cumberland River, Tenn. (gravel) | 100 | | | | | | | | | | | | | | | | | |
| M | Estill Springs, Tenn. (gravel) | 100 | | | | | | | | | | | | | | | | | |
| N-1 | Kentucky Dam area, Tenn. (bank gravel) | 99 | | 1 | | | | | | | | | | | | | | | |
| N-2 | Kentucky Dam area, Tenn. (river gravel) | 99 | | 1 | | | | | | | | | | | | | | | |
| O | Tishomingo, Miss. (gravel) | 100 | | | | | | | | | | | | | | | | | |
| P | Winn Parish, La. | | | | | | | 100 | | | | | | | | | | | |
| Q | Elgin, Ill. (gravel) | 4 | | | | | | | 92 (g) | | | | | | | | 4 | | |
| R | Bethany Falls, Mo. | | | | | | | 100 | | | | | | | | | | | |
| S | St. Louis Co., Mo. | | | | | | | 100 | | | | | | | | | | | |
| T | Reading, Mo. (gravel) | 95 | | | | | | | | 5 | | | | | | | | | |
| U | Kimball, Neb. (gravel) | | | | | | | 4 (e) | | | 90 (j) | | 2 | | | | 4 | | |
| V | Bill Williams, Ariz. (gravel) | | 7 | | | | 2 | | | 2 | 41 | | 10 | 17 | | | 19 | | 2 |
| W | Paso Robles, Calif. | | | | | | | 100 (f) | | | | | | | | | | | |
| X | Kutras, Calif. (gravel) | 6 (d) | | | | 25 | 17 | | | | | 8 | 7 | 4 | 5 | | 4 | 18 | 6 (k) |
| Y | Cowlitz River, Wash. (gravel) | | | | | | 13 | | | | | 3 | 59 | | 21 | | | 4 | |
| Z | Spokane, Wash. (gravel) | | | | | | | | | 49 (i) | | 19 | | | | 32 | | | |

(a) Includes ferruginous, chloritic, feldspathic, micaceous, and calcareous quartzites.
(b) Includes syenite (Lyon Mountain), monsonite, granodiorite, diorite, and gabbro.
(c) Calcareous chert.
(d) Micaceous chert.
(e) Soft, sandy limestone.
(f) Opaline dolomitic limestone.
(g) Includes 6 per cent. of sandy limonitic dolomite.
(h) Includes 18 per cent. of pure siliceous quartzite.
(i) Includes some siliceous limestone.
(j) Occurs as gravel; about half of the pebbles are separate quartz or feldspar fragments.
(k) Includes 5 per cent. of serpentine.

**Table II—MEAN COEFFICIENTS OF LINEAR THERMAL EXPANSION OF SIMILAR ROCKS FOR THE TEMPERATURE RANGE —4 to 140 DEGREES F.**

| Designations in Table I | Rock Name | Important Mineral Constituents (percentages approximate only) | Number of Specimens | Mean Coefficients of Linear Thermal Expansion per °F.×10⁻⁶ | |
|---|---|---|---|---|---|
| | | | | Average | Range |
| B | Quartsite | 94-99% quartz | 4 | 6.1 | 5.7 to 6.6 |
| D, Z | " | 50-80% quartz; feldspars, micas, calcite | 5 | 5.0 | 3.9 to 6.8 |
| B | Sandstone | 90-95% quartz; iron oxides | 5 | 5.1 | 4.2 to 5.8 |
| V, X, Y | " | Less than 75% quartz; feldspars, micas, calcite | 6 | 3.3 | 2.4 to 4.4 |
| B, C | Chert | 99% quartz and chalcedony | 4 | 6.2 | 5.9 to 6.3 |
| L, M, N | " | " | 7 | 6.4 | 6.2 to 6.6 |
| O, T | " | " | 7 | 6.2 | 6.1 to 6.6 |
| K | Chert (novaculite) | 99% quartz | 1 | 6.3 | |
| H, J | Calcareous chert | Quartz 85-90%, calcite | 4 | 6.0 | 5.2 to 6.6 |
| X | Micaceous chert | Quartz, mica | 1 | 4.1 | |
| California* | Opaline chert | Opal, chalcedony | 2 | 7.4 | 7.4 |
| B, D, U | Granite | Feldspars, quartz, micas | 3 | 4.2 | 3.3 to 5.1 |
| V | " | " | 1 | 1.0 | |
| E | Syenite | Feldspars, augite, quartz | 2 | 3.4 | 2.9 to 3.9 |
| Z | Grandiorite | Feldspars, quartz, micas | 1 | 2.0 | |
| X, Y, Z | Diorite, etc. | Feldspars, hornblende, micas, epiote | 5 | 3.6 | 3.4 to 3.7 |
| Oregon ** | Obsidian | Volcanic glass | 1 | 2.5 | |
| New Mexico*** | Pitchstone | Volcanic glass, feldspar | 1 | 3.8 | |
| V, X, Y | Dacite, trachyte | Feldspars, hornblende, chlorite, quartz | 3 | 3.3 | 2.9 to 3.6 |
| V, Y | Andesite | Feldspars, hypersthene, volcanic glass, micas, epidote | 6 | 3.4 | 2.1 to 4.1 |
| E, V, X | Basalt | Feldspars, augite, olivine, micas | 7 | 3.4 | 2.4 to 4.1 |
| X, Y | Volcanic breccias | Feldspars, quartz, chlorite, micas | 3 | 3.6 | 3.4 to 3.8 |
| A | Phyllite | Quartz, micas, calcite | 2 | 3.6 | 3.4 to 3.7 |
| Z | Argillite | Quartz, micas | 2 | 5.4 | 5.3 to 5.4 |
| X, Y | Greenstone | Actinolite, feldspars, micas, epidote, chlorite, quartz | 4 | 3.6 | 2.8 to 4.6 |
| D | Schist | Quartz, chorite, mica | 1 | 3.7 | |
| G, H, I | Limestone | Calcite | 7 | 2.8 | 2.1 to 5.1 |
| R, S | " | " | 3 | 2.4 | 1.7 to 3.6 |
| P | " | " | 3 | 1.6 | 0.5 to 3.8 |
| U, Z | Siliceous limestone | Calcite 50%, quartz, feldspar | 2 | 3.7 | 2.0 to 5.4 |
| W | Siliceous dolomitic limestone | Dolomite and calcite, opal 10%, chalcedony 10% | 4 | 5.1 | 4.8 to 5.3 |
| F, Q | Dolomite | Dolmite, quartz 5% | 5 | 4.1 | 3.7 to 4.6 |
| Q | Siliceous dolomite | Dolomite, quartz 50% | 1 | 4.8 | |

* San Luis Obispo and Paso Robles, California, not shown in Table I.
** Lake County, Oregon, not shown in Table I.
*** Magdalena Mts., New Mexico, not shown in Table I.

Commercial aggregates from 26 different sources were devided into various rock and mineral fractions as shown in Table I. Linear thermal expansion measurements were made on 137 specimens of these rock and mineral fractions and of some related materials. The mineral composition and texture of each of these rocks and minerals, determined by means of a petrographic microscope, and the respective thermal-expansion coefficients for three temperature ranges are given elsewhere [1].

**Results and Discussion** The common aggregate materials, excluding oriented crystals, were found to have thermal-expansion coefficients ranging from 0.5 to 7.7 × $10^{-6}$ per degrees F. between —4 and +140 degrees F. The mean coefficients for groups of similar rocks are given in Table II and those for individual minerals in Table III. Typical expansion curves for some of these materials are shown in Figures 1 to 3, inclusive. Variations in the coefficients for similar rocks or minerals may be attributed to four main factors, namely, crystal orientation, composition difference, texture, and irregular expansivity.

*Effect of Crystal Orientation*

Measurements were made on oriented crystals of quartz, calcite, and microcline feldspar to illustrate the differences in thermal expansivity in minerals along different crystallographic axes. These values are given in Table III.

A rock composed of many crystals, all of the same mineral, with haphazard crystallographic orientations should have, in all directions, a thermal-expansion coefficient representing an average of all possible orientations of the mineral concerned. The 19 cherts, for example, which are composed almost entirely of very fine-grained quartz (Table II) all have nearly equal thermal-expansion coefficients averaging 6.3 × $10^{-6}$. This value is very close to the arithmetic average of the thermal expansion of quartz in all crystallographic directions and, therefore, is representative of the coefficient of thermal expansion of rocks composed almost entirely of quartz grains with random orientations. If, on the other hand, a rock has more of its component crystal grains oriented in one direction than in any other, the coefficient of expansion in that direction will be different from those in other directions. A suspected example of this is the limestone from Jordanville, New York, three specimens of which gave coefficients of 2.2, 2.7 and 5.1 × $10^{-6}$, respectively.

*Effect of Composition Difference*

Rocks from various sources but of similar compositions have approximately the same expansivities, if orientation differences are disregarded. This was demonstrated for the siliceous rocks (Figures 1 B and C) and the carbonate rocks (Figure 2, limestones G, H, and I; dolomites F and Q). As a specific example, the 19 cherts which were composed of little but silica, had notably similar coefficients ranging from 5.9 to 6.6 × $10^{-6}$ (Table II). When other minerals were present, however, as in the seven impure cherts (Table II, H. J. X, and California) which contained varying amounts of calcite, mica and opal, the coefficients ranged from 4.1 to 7.4 × $10^{-6}$ (see also Figures 1, J, X, and California). Compare also sandstones B and V (Figure 1) and limestones H and W (Figure 2).

*Effect of Texture on Test Results*

The kind of texture here considered is grain size, although other textures may have important effects on

**Table III—MEAN COEFFICIENTS OF LINEAR THERMAL EXPANSION OF VARIOUS MINERALS FOR THE TEMPERATURE RANGE —4 TO 140 DEGREES F.**

| Mineral | Texture | Crystallographic Orientation of Direction of Measurement | Mean Coefficient of Linear Thermal Expansion per °Fx10⁻⁶ |
|---|---|---|---|
| Quartz | Single crystal | Perpendicular to c-axis | 7.5 |
| " | " | Parallel to c-axis | 4.1 |
| Chalcedony | Micro fibrous | Not oriented | 7.7 |
| Flint | Very fine-grained | " | 6.3 |
| Opal | Amorphous | " | 3.5 |
| Microcline | Single twinned | Perpendicular to OIO cleavage | |
| feldspar | crystal | and parallel to b-axis | 0.6 |
| " | " | Parallel to a-axis | 9.5 |
| " | " | Approximately perpendicular to the previous two specimens | 1.9 |
| Serpentine | Fine lamellar | Not oriented | 3.3 |
| Magnesite | Very fine-grained | " | 4.5 |
| Calcite | Single crystal | Perpendicular to c-axis | −2.8 |
| " | " | Parallel to c-axis | 14.3 |

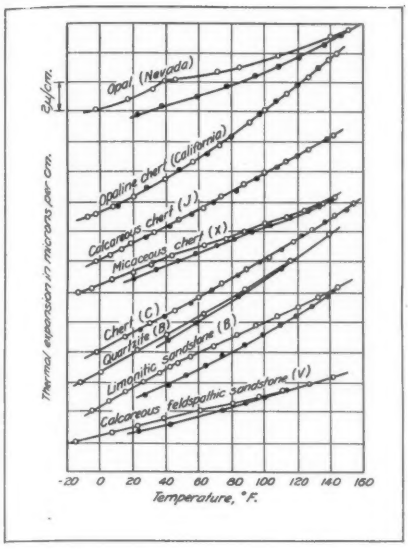



Fig. 1. Thermal-expansion curves of various siliceous rocks; o = heating points, • = cooling points; letters in parentheses refer to designations in Table I.

rock expansivities. The grain size is particularly important in the present method of test because of the small size of the test specimen. The average height of the latter was only about ¼ inch. The total number of grains through which measurement was made is strictly a function of the grain size of the rock and was estimated to be as follows:

| Grain Size (*Millimeters*) | Grain Size Terminology | Number of Grains Through Which Measurement Was Made |
|---|---|---|
| Less than 0.02 | Very fine | More than 300 |
| 0.02 to 0.2 | Fine | 30 to 300 |
| 0.2 to 2.0 | Medium | 3 to 30 |
| 2.0 to 10.0 | Coarse | 1 to 3 |
| Over 10.0 | Very coarse | Less than 1 |

The thermal expansion coefficient

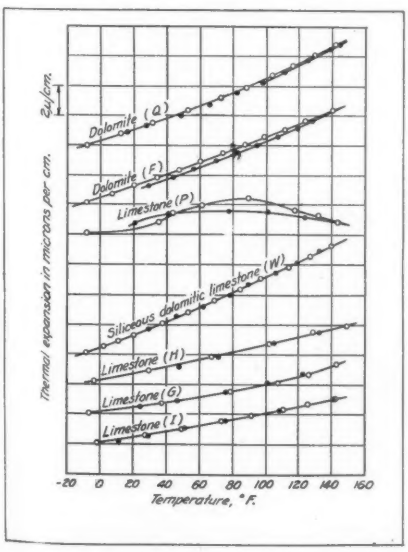



Fig. 2. Thermal-expansion curves of various carbonate rocks; o = heating points, • = cooling points; letters in parentheses refer to designations in Table I.

of a specimen of very fine-grained, randomly-oriented rock is, therefore, an average of all possible crystal orientations of all minerals present in that rock and represents the actual expansivity of the rock. The coefficient of a coarse-grained rock, on the other hand, may actually represent the expansivity of only one crystal orientation of one mineral and, accordingly, can not be considered as a true representation of the expansivity of that entire rock.

*Rocks with Irregular Expansion*

Some rocks do not expand uniformly on heating and the resulting curves show more or less definite breaks in their continuity caused by a change in the rate or in the direction of expansion. In most of these cases the rocks expand on heating

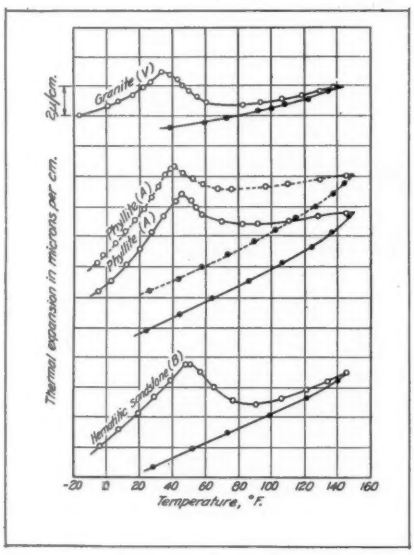



Fig. 3. Thermal-expansion curves of several rocks with irregular expansivities; o = heating points, • = cooling points; letters in parentheses refer to designations in Table I.

until temperatures between 32 and 50 degrees F. have been reached. With further heating they either expand at a lesser rate (Nevada opal and sandstone B, Figure 1) or contract (Figure 3) until temperatures between 60 and 86 degrees have been reached, when expansion is resumed. Rocks exhibiting this reversal include, in addition to those illustrated, a few other sandstones, a volcanic breccia, and two dolomites. As a general rule these irregularities are not evident on cooling, but a Louisiana limestone was found which exhibited reversals both on heating and on cooling (Limestone P, Figure 2). The effect which irregular expansion has on the calculated mean coefficients may be observed in Table II by comparing the granite from Bill Williams, Arizona, with the other granites.

It is possible that some of these irregularities are caused by capillary water in the specimens. The latter were dried for several days over $CaCl_2$ before testing, but all the water was not necessarily removed. The specimens were held overnight at temperatures well below freezing so that some of the capillary water present was probably frozen. As the ice melted, two complicating factors affected the rate of expansion of the specimens, namely, (1) the volume change occurring as ice melts into the corresponding smaller volume of water, and (2) the change in the heating rate of the specimen as the heat of fusion of the water is absorbed. This latter factor may help to explain the occurrence of the breaks in continuity a few degrees above freezing.

**Aggregate Expansivity in Relation to Concrete**

In concrete structures, where resistance to frost action is one of the properties required of the concrete, the thermal expansion of the aggregate may be an important factor. If, for instance, the thermal expansion of an aggregate differs considerably from that of the cementitious matrix, excessive internal stresses may be set up if the concrete is subjected to large temperature changes. Concrete failures have been attributed [2] to an initial weakening of the concrete by such internal stresses. The weakened concrete then became susceptible to frost action which caused the actual disruption. This sequence of disintegration has recently been demonstrated in the laboratory by Pearson [3].

Four types of materials, classified according to expansivity characteristics, which might mainifest themselves unfavorably in concrete are:

(a) Materials having a uniform coefficient of thermal expansion markedly different from the normal value for concrete.

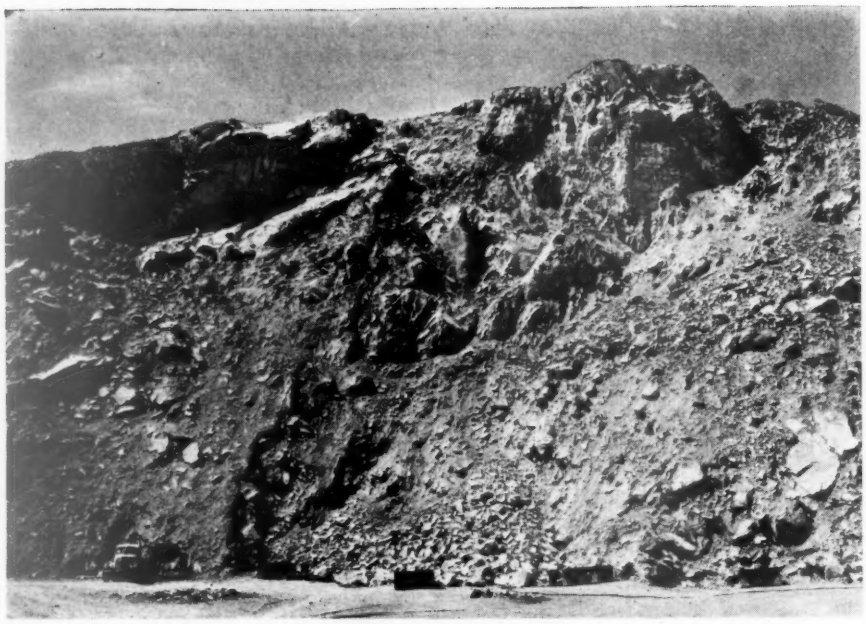
(b) An aggregate composed of single crystal fragments with different expansivities in various crystallographic directions.

(c) An aggregate (a gravel or a crushed coarse-grained rock) composed of two or more fractions present in considerable amounts which have widely different expansivities.

(d) A material with irregular expansion of the type illustrated in Figure 3.

At least two instances of disintegration of concrete have been ascribed recently to type (a), namely, a dolomitic marble aggregate with a thermal expansion coefficient

(*Continued on page* 51)



Maronick Limestone Company quarry face with some of the 2½ cubic yard buckets being loaded.

View of the plant with railroad car waiting to be loaded.

Truck picking up loaded 2½-cubic yard bucket at quarry face.

# This Montana Quarry Supplies Flux Stone to Local Smelter

another ON THE SPOT report

ON a recent trip around the Pacific Coast it was the writer's pleasure to visit one of the most interesting quarrying operations he has yet encountered. This quarry, operated by the Maronick Limestone Company, is about 2½ miles south of East Helena, Montana, and supplies fluxing stone for the East Helena smelter of the American Smelting & Refining Company. It is a small

**By W. E. TRAUFFER**

operation, with a capacity of about 50 tons per hour, but the character of the deposit, the methods of operation and, above all, the safety measures taken make it noteworthy.

This quarry had been operated on a small scale for a few years when it was taken over in 1908 by N. A. Maronick, a former worker at the smelter. Mr. Maronick had been a quarryman in his native Austria, where his ancestors for 150 years had followed that trade. His bid for the job of operating the quarry was accepted and he carried on this work until 1928 when his son, E. P. Maronick, the present operator, took over. The contract with the smelter has been renewed periodically in these 36 years during which more than 1,000,000 tons of stone has been produced. The smelter requirements have averaged about 50,000 tons annually but about 72,000 tons was produced in 1942 and again in 1943.

The operations have been modernized from time to time as better methods and equipment became available. During the elder Maronick's time no crushers were used, the large rock having been broken with sledge hammers. Perhaps the most important improvement made to date was the purchase of a Dempster Dumpster in 1941. This replaced the original 2½-cubic yard gravity cars which formerly carried the stone from the face on a radial track system to the quarry's edge for loading into railroad cars. The empty cars were hauled back to the face by horses in what was almost an automatic operation. The Dumpster has increased the quarry capacity per man-hour but the chief saving has been found in the elimination of the constant track shifting necessary when the cars were used. It also makes possible selective quarrying and simplifies the removal of clay.

The deposit is in the Madison limestone formation which has for many years supplied the Three Forks Portland Cement Company's plant at Trident, 60 miles to the southeast, and is ideal for fluxing purposes. The stratification is in general almost vertical with occasional clay seams which are becoming less frequent as the operations are carried farther back into the mountain side. The quarry face is now about 700 feet long with a maximum height of 180 feet and an average of 150 feet, which will decrease somewhat as the quarry is developed. The vertical stratification has the advantage of breaking to a solid face with each succeeding shot but in wet weather there are frequent slides. These formerly covered up the tracks and damaged the cars so badly that it took 2 or 3 days to repair them. These slides seldom damage the buckets now used and they can be repaired much more quickly.

Blasts are made with coyote holes, which are varied in location and depth to fit the height and condition of the face. In a recent blast three coyote holes, respectively 40, 70, and 35 feet long, were used. Each of the two short holes had a cross tunnel at its end and the long center hole had three cross tunnels, making a total of 300 feet of hole. All the tunnel and secondary drilling is done with Ingersoll-Rand jackhammers for which the air is supplied by a compressor of the same make. A total of 30,000 pounds of

du Pont Red Cross bag powder was used to bring down over 75,000 tons of rock. This shot was witnessed by an audience of about 5,000 persons and was reported in newspapers all over the state.

In the next shot a single 40-foot coyote hole was used to take about 10,000 tons of stone off a corner of the face. This was followed by a larger center shot. The explosive charges are detonated by a battery.

A slow-motion picture is taken of each blast to reveal any flaws in the layout or loading of the holes and to prevent the repetition of any mistakes that may be revealed. In the movies of a recent shot some breakage and movement were noticed in one section of the face and in the next shot allowance was made for this condition by loading more lightly than usual at this point. This prevented a dangerous blowout and saved considerable explosive.

At one time all the handling of materials in and out of the coyote hole was done by the manual chain relaying system for buckets of rock or muck, bags of powder, etc. A crew of 12 men then worked a full day loading a 2- by 3-foot coyote hole of average length. In 1922 a tram-car hauling system was adopted and the same work is now done in less time by only 5 men. The cars used are 18 inches wide, 15 inches high and 5 feet long. They run on 9-inch gage tracks with 8-pound rail. Much of the muck used for stemming or filling between explosive charges is done with tunnel fines.

In order to eliminate fumes in the holes the powder bags are double dipped in paraffin. Also when a blast is in preparation all the men wear nailless shoes. Smoking is banned during this period but chewing tobacco is supplied as a substitute. The men are also given ice-cream to cool them off and to counteract the powder fumes. An interesting practice, said to have originated in Europe, is to put vinegar in the drinking water to reduce the craving during hot weather. Most of the men voluntarily wear hard-toe safety shoes.

The Dempster Dumpster is mounted on an International truck chassis and has ten 2½-cubic yard buckets. At present, because of the labor shortage, about 7 buckets are usually in use. When working with a full crew two men load each of the 7 buckets with a 3-bucket swing to make up for hauling time. With an average haul to the crusher of about 300 feet the Dumpster has no trouble keeping ahead of the workers, averaging 45 to 50 tons per hour, about the maximum crusher capacity. When clay seams are encountered several buckets are used to get rid of this material.

The primary crusher is an old 10- by 18-inch Dodge-type jaw crusher of unknown make or vintage and is driven by a 50-horsepower motor. This reduces the stone to 3-inch size and under and discharges it through a chute direct into railroad gondola cars for shipment. A rectangular flat steel plate suspended perpendicularly from a lever arm acts as a backstop to keep the stone from overshooting the car. The loaded cars are hauled a distance of about 2½ miles to the smelter over the Missouri Pacific Railway.

The task of cutting the fuses for blasting has been simplified by the use of an original machine which cuts about three fuses per second. The fuses are measured on a board from a coil suspended above the machine. A push with the knee on a lever brings together two blades made of mowing-machine sickle sections which cut the fuse.

Baffle plate which prevents spilling of rock while loading and which can be lifted out of the way when cars are moved.

Truck discharging stone from 2½-cubic yard bucket.

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**Quarry** (*from page 42*)

deliveries and to build up stock piles. Stone is reclaimed from these piles by a Barber-Breen stockpile loader. All shipments are weighed on a Fairbanks truck scale.

The two conveyors and the screen are driven by individual 15-horsepower electric motors through V-belts. Goodyear conveyor belting is used.

Triple-deck screen which does all the sizing.

According to M. N. Hedrick, general manager and superintendent, the demand for the product of this plant is now at a low level compared to the recent war-construction demands. The post-war prospects are bright, however, due to the need for road construction in this area. The company also has several other quarries, the one at Winston-Salem being the only one of these now in operation.

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Connecticut, not normally ranked as a mineral producing state, is now mining about 6 per cent. of the country's domestic mica, according to figures released recently by the War Production Board.

# AIR COMPRESSORS

## Part IV — Putting Air to Work

By C. W. GIBBS
Compressor Engineering Department,
Ingersoll-Rand Company

COMPRESSED air is power and power is precious. Compressed air should therefore be used wisely, carefully and efficiently. There is no other system where, by exercising good care, one can get the increase in work that is possible with compressed air.

The power available for use in a compressed-air system is represented by the volume delivered at the tool and the pressure at which it is delivered. Regardless of the use to which compressed air is put, its effectiveness is limited by these conditions.

In general, two things operate to prevent the most effective use of air. One is the loss of air through leakage, and the other is excessive pressure loss. Both represent a direct loss in power, a wastage that should and can be prevented.

It is, of course, unreasonable to expect a compressor plant to maintain full pressure if the tool requirements plus leakage exceed the installed compressor capacity. Such a condition always results in lowered air pressure and inefficient operation of the tools. The answer to this would seem to be the installation of an additional compressor, but first it is wise to determine where the air actually goes. The tools may need to be repaired; and always there is leakage, most of which can be avoided. After all, one doesn't compress air just to blow it out a leaky gland on a valve stem or through bad threads on a pipe joint or a hole in a hose. Air is compressed to operate a tool, to make manpower more effective and to reduce production costs. Air wastage defeats such results.

**Tool Maintenance** Maintenance of tools is one of the most important jobs. It should be done in a shop equipped with devices to check tool condition so that the effectiveness of repairs may be assured. Although rock-drill operating conditions can seldom be duplicated in the shop, it is possible to set up an approximate standard, using dull steel on a block of concrete for example, measuring the air consumption while the drill is running. A record should be kept on every drill, starting with a test when new, in order to establish a figure to be approached with each overhaul.

The air-measuring apparatus is not expensive or difficult to use. A direct-reading type available up to 450-c.f.m. capacity is shown in Figure 1. This meter, with a good pressure gage and a reducing valve to hold a steady pressure, will do much to assist the repair man in doing his job well.

**Air Leaks** Most people would be surprised at the amount of compressed air lost through leaks and they would also be surprised at how easy it is to prevent such leaks. Steam and water leaks show visually and are messy and sometimes dangerous; hence they are promptly repaired. Compressed air leaks can not be seen, small ones can not be heard, and air leaks are not obnoxious; consequently there may be a tendency to forget air-system maintenance.

A periodic leakage test is not difficult to run during an off period. First, be sure that all manifold outlet valves and hose connections are shut, then maintain full pressure on the rest of the system. Concentrate the load on one compressor if possible. Make a time record of the seconds the compressor is loaded and unloaded. If the unit is equipped with 3- or 5-step control, keep a record of the time of operation at each load. From these data and the known rated full-load capacity of the compressor, a close estimate of the amount of air leakage is easily obtained. Because of the wide variation in plants and layouts, the percentage will vary greatly, but it is probable that anything over 5 per cent. in any plant warrants extensive attention. Tests have been run showing as high as 20 per cent. leakage; many plants may show 10 per cent. How many tools would this wasted air operate for you?

An idea of what is possible in the way of tight lines is given by the gas industry, which are that leakage in a mile (5,280 feet) of 3-inch high-pressure line should not exceed one cubic foot per minute.

The most prolific leaks are the small ones. For example, an actual count of the number of valves in any

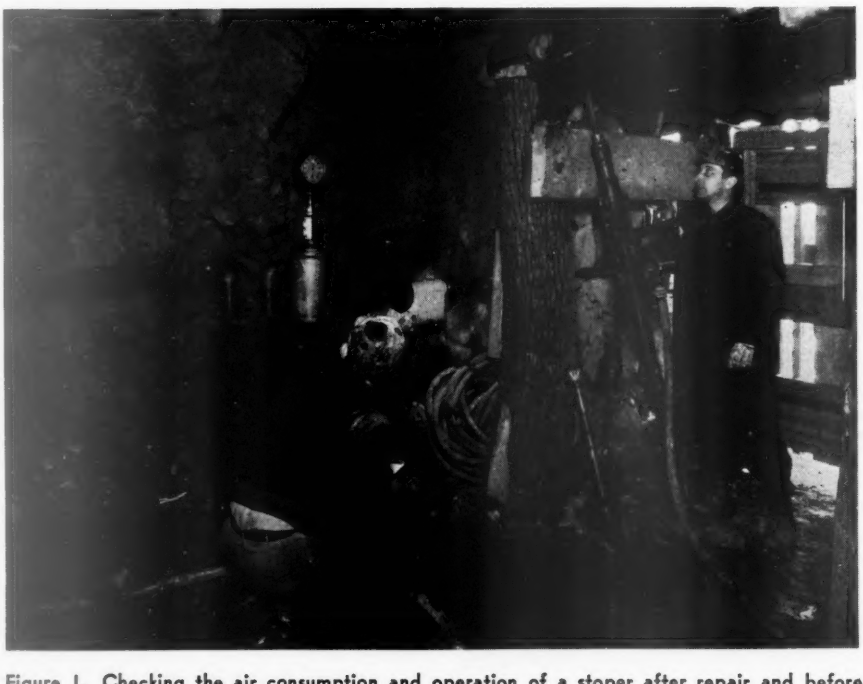

Figure 1. Checking the air consumption and operation of a stoper after repair and before taking it underground again.

system will surprise one. Each valve (Figure 2) has a stuffing box which can leak and often does. It takes little time to tighten the gland and stop this loss.

Some leaks can be heard. These should have been repaired long ago. Other leaks are not so easily found. Swabbing joints with soap suds is one good method. Another involves the injection of an aromatic oil at the compressor plant during a test period. Leaks are revealed by the odor. Oil of wintergreen can be used for this.

Hose and hose joints are frequent "leak spots." Hose couplings and

Figure 2. Keep packing nuts snug to prevent leaks.

menders must be properly applied and the type of "repair" shown in the lower sections of Figure 3 should not be used. These not only leak, but are extremely hazardous.

Hose which has been abused or accidentally punctured is often "repaired" by tying a rag over the hole. Any such hose should be repaired correctly, safely, immediately.

Are branch-line valves (Figure 5) shut at the main when the branch or manifold is not being used? Failure to do this keeps the usually less tight branch lines and hose under pressure when not in use. Much leakage can be eliminated through stricter use of the shut-off valve at the main or header.

**Water in Air Lines** Maintenance of air lines is always vital, but never more so than now. With the shortage of manpower it is to be presumed that maintenance may have slipped a little. It is possible that another drill could be run satisfactorily if the leaks in your system were eliminated.

As has been pointed out in a previous article of this series (December 1943), there are certain conditions, atmospheric and otherwise, when it is to be expected that some moisture will condense in the pipe lines. Proper equipment at the compressor plant will eliminate most water troubles, but not necessarily all. It is essential therefore, that drains (Figure 6) be placed at the low points in the line, and *drained*. The practice of installing a receiver, not necessarily of large size, at the point where branch lines take off is good. This traps and removes the condensate formed up to this point and is a desirable feature for other reasons which will be discussed later. Proper layout, trapping and draining of the air-distribution system will do much to eliminate wasteful "blowing" of the lines at the start of work to clear out the water. Air thus used is pure waste.

It is debatable whether leakage, or excessive pipe- and hose-line pressure drop is the more wasteful, but it is certain that many quarries and mines fail to obtain the maximum from their drills and tools because the air pressure is too low *at the tool* (Figure 7). Elimination of leaks automatically tends to increase pressure in a given plant, but there are other relatively easy ways to improve an existing "too small" system and thus, by reducing flow losses, to raise the pressure still further and make available more power.

A compressed-air system is just like a water system. The fluid in either case can not flow without friction which uses up energy (pressure). There will always be some friction loss. The problem is, therefore, one of limiting the pressure drop to a reasonable value.

Compressors for general service are designed for 100-pound gage operating pressure and tools are usually designed for 90-pound pressure. A 10-pound drop is therefore generally considered reasonable.

**Pipe Sizes** The following abridged table will assist in determining the pipe sizes needed to limit the pressure loss for various free-air-flow volumes with 100-pound gage initial pressure.

**FRICTION LOSS IN 1,000 FEET OF PIPE**

(*pounds per square inch*)
initial pressure 100 pounds gage

| Cubic Feet Free Air per Minute | Nominal Pipe Size (*inches*) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 1½ | 2 | 3 | 4 | 5 | 6 |
| 100 | 27.9 | 2.86 | .77 | .... | ..... | .... | .... |
| 200 | .... | 11.4 | 3.06 | .37 | ..... | .... | .... |
| 300 | .... | 25.8 | 6.85 | .84 | .20 | .... | .... |
| 400 | .... | 45.8 | 12.1 | 1.50 | .35 | .... | .... |
| 500 | .... | ..... | 19.2 | 2.34 | .55 | .... | .... |
| 750 | .... | ..... | 43.2 | 5.2 | 1.25 | .... | .... |
| 1,000 | .... | ..... | ..... | 9.3 | 2.21 | .... | .... |
| 1,500 | .... | ..... | ..... | 21.0 | 4.9 | 1.51 | .57 |
| 2,000 | .... | ..... | ..... | 37.4 | 8.8 | 2.72 | .99 |
| 2,500 | .... | ..... | ..... | 58.4 | 13.8 | 4.2 | 1.57 |
| 3,000 | .... | ..... | ..... | ..... | 20.0 | 6.0 | 2.26 |

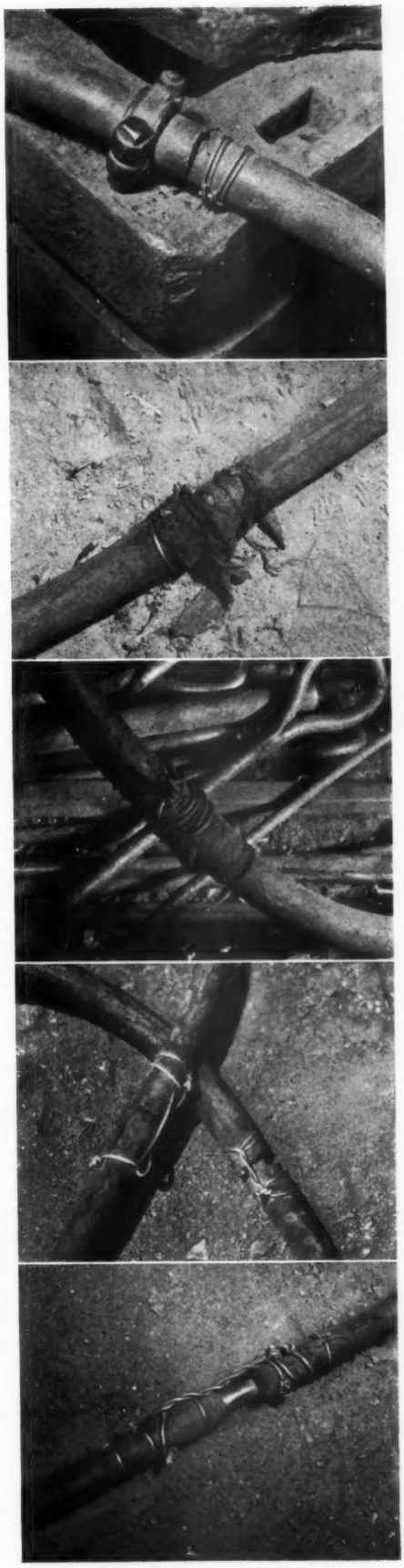

Figure 3. Proper and improper hose connections. The top view shows two types of hose clamps—bolted and wire—correctly applied. The other pictures illustrate makeshift clamps, which waste compressed air and violate safety standards.

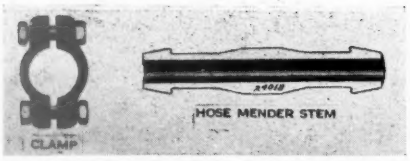


Figure 4. Typical safe hose clamp and mender.

Friction loss is directly proportional to pipe length.

Never be stingy on pipe sizes. A large part of the cost of a pipe line is the cost of installing the pipe. The use of one size larger will increase the total expense but little and will result in benefits for as long as the line is used.

In an existing layout which has been "overextended," or loaded beyond its capacity, there are a number of changes which will reduce pressure loss. One such change is to "loop" the system. The surface shop may have too many tools working off a main which extends along one side of the shop. Probably the hose on some tools must be longer than is desirable. The solution is to run a header down the other side of the

Figure 5. Shut branch-line valves when tool is not being used for a while.

shop tying in at both ends with the first line. Half of the tools on the original line should be connected to the new line. This gives better pressure at the tool and assures a plentiful air supply when needed.

The same system could be used in some quarries where it would be possible to tie several drop feeder lines together at the bottom.

The value of a receiver or air tank as a moisture separator at the end of a feeder line has been mentioned before. A tank in such a location has also great value as a storage chamber for air to be used when there is a sudden demand. Having air stored at the point of use results in steadier main-line flow, more uniform compressor load and less pressure fluctuation. It will be found that the average pressure with such an auxiliary tank is higher than without it.

In cases where the main-line losses are serious consideration should be given to installing a parallel line tied in with the original at the ends and, in some cases, at intermediate points. The twin line need not be the same size as the original. Care should, however, be used in figuring the correct size, and a plentiful allowance should be made to take care of increased use of air. Always use the

Figure 6. Install condensate traps and collecting tanks ahead of branch lines and drain frequently.

next larger size than you figure you should have; it pays.

In making pipe-line calculations do not fail to allow for the fact that as pressures are increased at the tool, the free air required by the tool also increases. The tool accomplishes more in a given time however, so that, although the cubic feet per minute is increased, the total cubic feet used on an operation is decreased. Pipe lines must be designed for the correct flow however, so take this into account.

**Hose** Distribution piping is not the only source of air-pressure loss. All too frequently a major loss is entailed in the hose used to connect tools to the manifold or main. The use of two or more lengths of hose is always to be guarded against (Figure 8). Manufacturer's representatives report again and again that complaints of low drilling speed are due solely to the use of long hose lines and consequent low air pressure.

Pulsations from the operation of the rock drill or tool will cause a pressure loss much greater through a hose than that developed in a pipe with steady flow. The condition of the hose lining also influences the

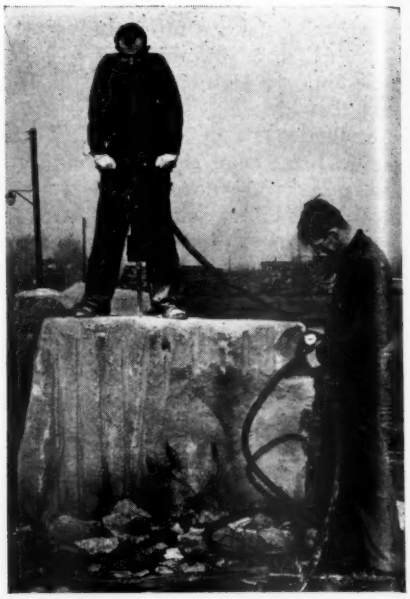

Figure 7. Check the air pressure at the tool. With rock drills the pressure must be measured at the feed-hose inlet. The pulsation is too great at the tool.

pressure drop seriously. Rough lining may increase it 50 per cent.

The following table is based on actual tests with good hose in 50-foot lengths and 90-pound gage air pressure at the inlet:

**HOSE FRICTION LOSS IN 50-FOOT LENGTHS; COUPLINGS INCLUDED EACH END**
(*pounds per square inch*)
Initial pressure 90 pounds gage

| Cubic Feet Free Air per Minute | Nominal Hose Size (*inches*) | | | |
|---|---|---|---|---|
| | ½ | ¾ | 1 | 1¼ |
| 30 | 2.4 | .4 | .1 | ..... |
| 50 | 9.5 | 1.1 | .3 | ..... |
| 70 | 22.0 | 2.3 | .6 | .2 |
| 90 | ..... | 4.0 | .9 | .3 |
| 110 | ..... | 6.2 | 1.4 | .4 |
| 130 | ..... | 9.0 | 2.0 | .6 |
| 150 | ..... | ..... | 2.8 | .8 |

Figure 8. Run pipe of generous size right up to the job. Don't couple several hose lengths together.

It has been stated previously that 90 pounds is the correct or design pressure for most tools and drills. That this is also the most economical condition to maintain is evident from the curves in Figure 9.

The basic information represents an average of the drilling speed in granite of four widely used rock drills and the corresponding air consumption. From these has been plotted the cubic feet of air used per inch of hole drilled. The study has been carried further and a curve has been made of the percentage of compressor horsepower required per inch drilled.

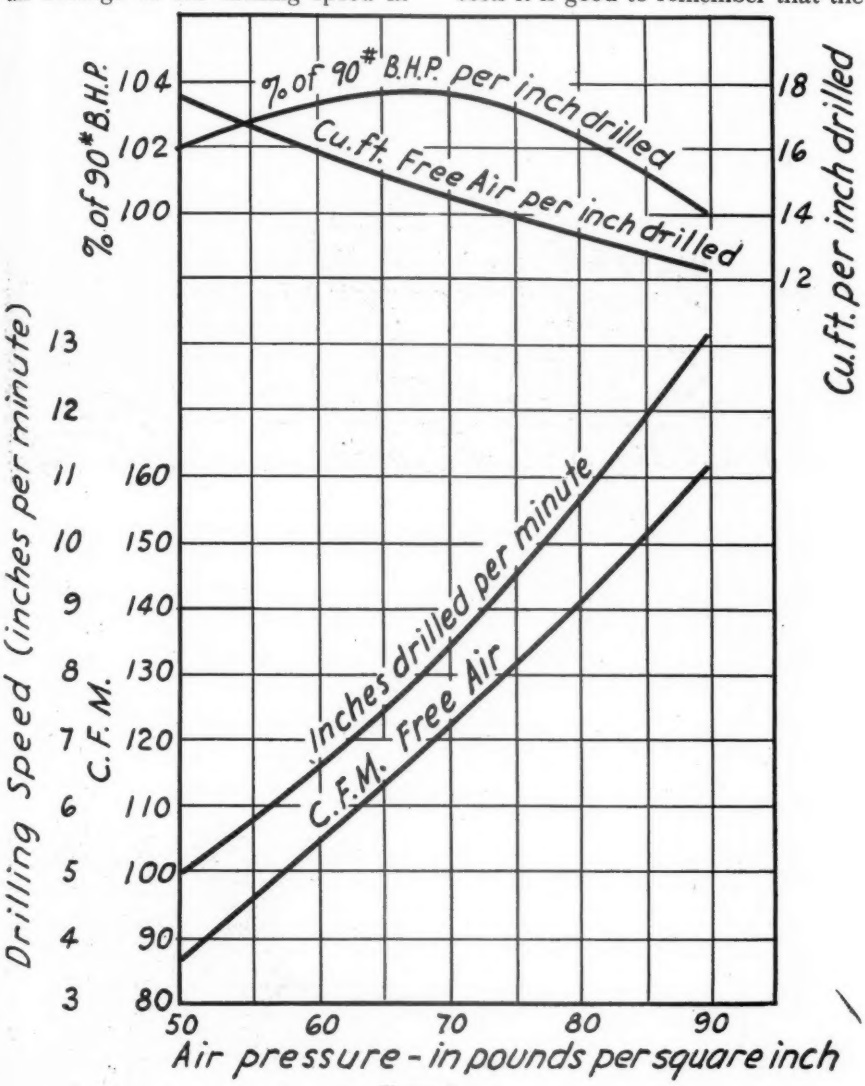


Figure 9.

An analysis of these curves to determine the results which could be expected if a quarry were to increase operating air pressure at the drill from 60 pounds to 90 pounds indicates the following:

1. Drilling speed would be increased 103 per cent. Conversely the time to put down a hole would be halved.

2. Air consumption per hole would be decreased 23 per cent.; this in spite of the fact that the air consumption per minute has increased.

3. The cost of compressed air (power used) to drill a given footage is slightly reduced. The total cost, labor included, would be reduced much more. (In connection with costs it is good to remember that the cost for compressed air is frequently less than 5 per cent. of the total cost of doing a given job.)

Remember, leaks are insidious things and must constantly be guarded against. Also it is easy to add and add and add to pipe lines but it is better management to check pressures at the tool before going too far. A larger pipe will be less expensive than decreased production. And it always pays to maintain full 90-pound air pressure at the tool.

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**Aggregates** *(from page 45)*

of $2.0 \times 10^{-6}$ studied by Pearson [2] and a fine-grained limestone aggregate with a coefficient of $2.2 \times 10^{-6}$ mentioned by Hornibrook [4]. These aggregates were used in concretes which disintegrated after exposure to one northern United States winter. An example of type (b) has been pointed out in central New York by Swayze [5] where a coarse aggregate consisting of single calcite crystals was used in a cast stone. This stone was in very bad condition after exposure to one winter.

The linear thermal expansion coefficient of hardened Portland cement, within the normal range of atmospheric temperatures, varies between approximately 6 and $9 \times 10^{-6}$ as reported in the *Concrete Manual* [6]. The coefficients of linear thermal expansion, as determined in the present investigation, for groups of similar aggregate materials (not including the oriented crystals) ranged from an average of $7.4 \times 10^{-6}$ for the opaline cherts to an average of $2.4 \times 10^{-6}$ for the limestones (Table II). While most of these aggregate materials have thermal expansivities close to or within the range of expansivities for hardened Portland cement, a few have sufficiently different expansivities to warrant some question as to their satisfactory performance under severe weather conditions. Where aggregates containing such materials in large amounts are to be used in severe exposures, an examination should be made of the service record in structures having similar exposures. Lacking service background, they should be subjected to laboratory tests of the type described by Pearson [3].

The authors express their appreciation to the United States Bureau of Reclamation's office in Denver, the Tennessee Valley Authority, the State Highway Departments of Washington, California, Missouri and Nebraska, and the Portland Cement Association, for their co-operation in supplying samples. The authors also wish to thank A. T. Goldbeck, of the National Crushed Stone Association, and Stanton Walker, of the National Sand & Gravel Association, for their valuable suggestions regarding sources of aggregate materials.

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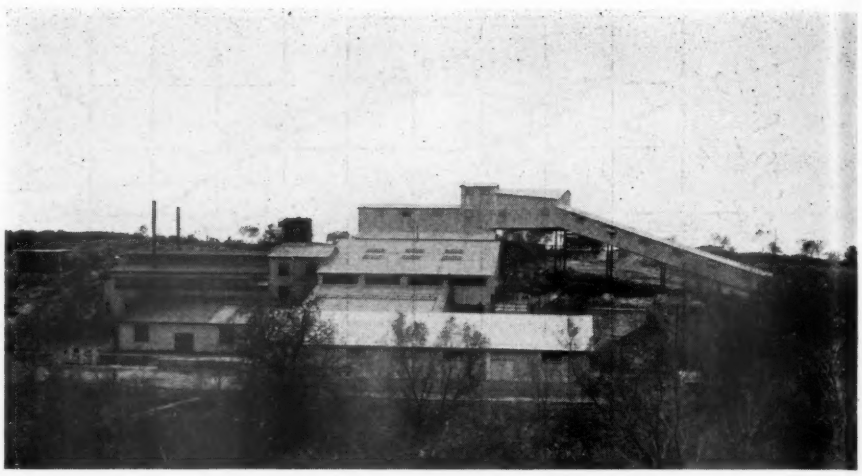
# Graphite Mill, Born in World War 1, Re-Opened to Supply Current Demand

another ON THE SPOT report

WHEN the submarine menace threatened to cut off entirely the sources from which we obtained many vital materials, every effort was made by the government to encourage the production of these materials in this country. Among these materials was graphite, which we imported in normal times chiefly from Ceylon and Madagascar. Most of our new production came from deposits which were operated during the last war for the same reason and which could not compete with imports in normal times and lay dormant until their recent reopening. Now that the submarine menace has been largely overcome graphite is again being imported. As a result many of the local operators are already shut down and others will soon follow.

One of the more important deposits thus reopened, but which the owners plan to keep in operation, is that of the Southwestern Graphite Company, 10 miles west of Burnet, Texas. This deposit was first worked in 1913 and the original plant was operated by the Southwestern Consolidated Graphite Company until it burned down in 1927. It was rebuilt at once but was shut down in 1929.

The present owners bought the property in 1935 and moved some of the equipment to their gold mine near Chinese Camp, California. In March, 1942, some of this equipment was returned to the plant and Defense Plant Corporation, an R. F. C. subsidiary, agreed to acquire and lease to the company new equipment, including conveyors, crushers, flotation cells, concentrating tables, rod mills, etc., which was also installed. Most of the buildings were in good condition and only a few additions were necessary. The original mill had a capacity of 150 tons in 24 hours. This has been increased to 250 tons and can be further increased by the installation of another drier and by modernizing the second of the two original driers. The present 8-hour operation of the quarry can readily be extended.



General view of the plant from the waste pile.

The deposit is a graphitic schist with a vein of 8- to 12-per cent. ore varying from 50 to 200 feet in width between walls of hornblend schist. Test holes drilled to a depth of 100 feet over the entire area indicated at least 1,000,000 tons of ore with a content of from 6 to 10 per cent. carbon.

The overburden of clay and dirt, averaging 20 feet in depth, is removed at off-times by the quarry shovel and trucks. The deposit was worked on one 16-foot level until lean ore was encountered in each direction. A second 16-foot level is now being worked and a third will follow. When this is completed some other method of excavating will be used. The 16-foot blast holes are drilled by a Sullivan Wagon drill using 1¼-inch steel. The holes are loaded with Atlas 60 per cent. gelatin dynamite and are detonated 30 to 35 at a time in a single row by electric blasting caps. Sullivan jackhammers are used for secondary drilling and Atlas Number 3 Geladyne explosive is used for this purpose.

The ¾-cubic yard gasoline shovel loading ore.

The wet storage vats, thickener, and screen building.

The ore is loaded by a Number 255A P&H gasoline shovel with a ¾-cubic yard dipper into Dodge 1½-ton dump trucks hauling 5-ton loads. At the plant the ore is discharged on a 14-inch grizzly and the oversize is sledged through it into the 18- by 30-inch Telsmith primary jaw crusher. This is driven through V-belts by a 60-horsepower G.E. motor. The 3-inch crushed ore goes to a belt-bucket elevator from which it is discharged through a spout on a 3- by 8-foot Allis-Chalmers 1-deck screen with ¾-inch openings. The oversize material goes to a 3-foot Symons short-head cone crusher which is driven through V-belts by a 60-horsepower G.E. motor. Stephens-Adamson (Los Angeles) conveyors and elevators are used.

The minus-¾-inch material falling through the screen is carried on an 18-inch by 100-foot belt-conveyor to one of three 250-ton cylindrical steel bins. A belt feeder reclaims the material from storage into a 5- by 10-foot Mine & Smelter Supply Company Marcy rod-mill. The product of the mill is discharged into a Denver unit flotation cell which is used as a scalper. A pine-oil reagent is used. The tailings go to the primary section of a Dorroc dual rake classifier which is in closed circuit with the rod-mill, and the coarse from this is reground.

The concentrates from the unit cell go to a 2-cell, 44-inch American Cyanamid Fagergren flotation machine or one of the three 44-inch Fagergren finishing cells. The concentrates from the two 44-inch cells go to the three finishing cells.

The overflow from the Dorrco primary classifier goes to four 56-inch Fagergren rougher cells for first treatment.

The tailings from the two 44-inch Fagergren rougher cells go to a sump from which a 2-inch Wilfley pump feeds them to a K & K clean-up flotation machine. The tailings from this machine go back to the four 56-inch rougher cells and the concentrates go back to the two 44-inch cells.

The tailings from the four 56-inch cells go to waste and the concentrates go to a sump from which a 3-inch Wilfley pump feeds them to a cone receiving tank ahead of the secondary section of the Dorrco classifier.

The tailings from the three 44-inch finishing cells go to a sump from which a 4-inch Wilfley pump feeds them to the cone receiver ahead of the classifier.

The overflow of the secondary section of the classifier goes to the two 44-inch cells. The coarse goes back to the mill along with that from the primary classifier.

The secondary crusher with scalping screen above.

The concentrates from the three 44-inch Fagergren finishing cells overflow to a sump and a 2-inch Wilfley pump feeds them to a Mine & Smelter Supply Company Wilfley concentrating table. This makes a three-way split. The tailings go to waste. The middlings go to a sump and thence to a cone and back into the circuit for further treatment.

The reagents used in the various cells in this department are pine oil, kerosene, cresylic acid, du Pont B-23, and silicate of soda. For depressing American Cyanamid & Chemical Corporation reagent Number 633 is used.

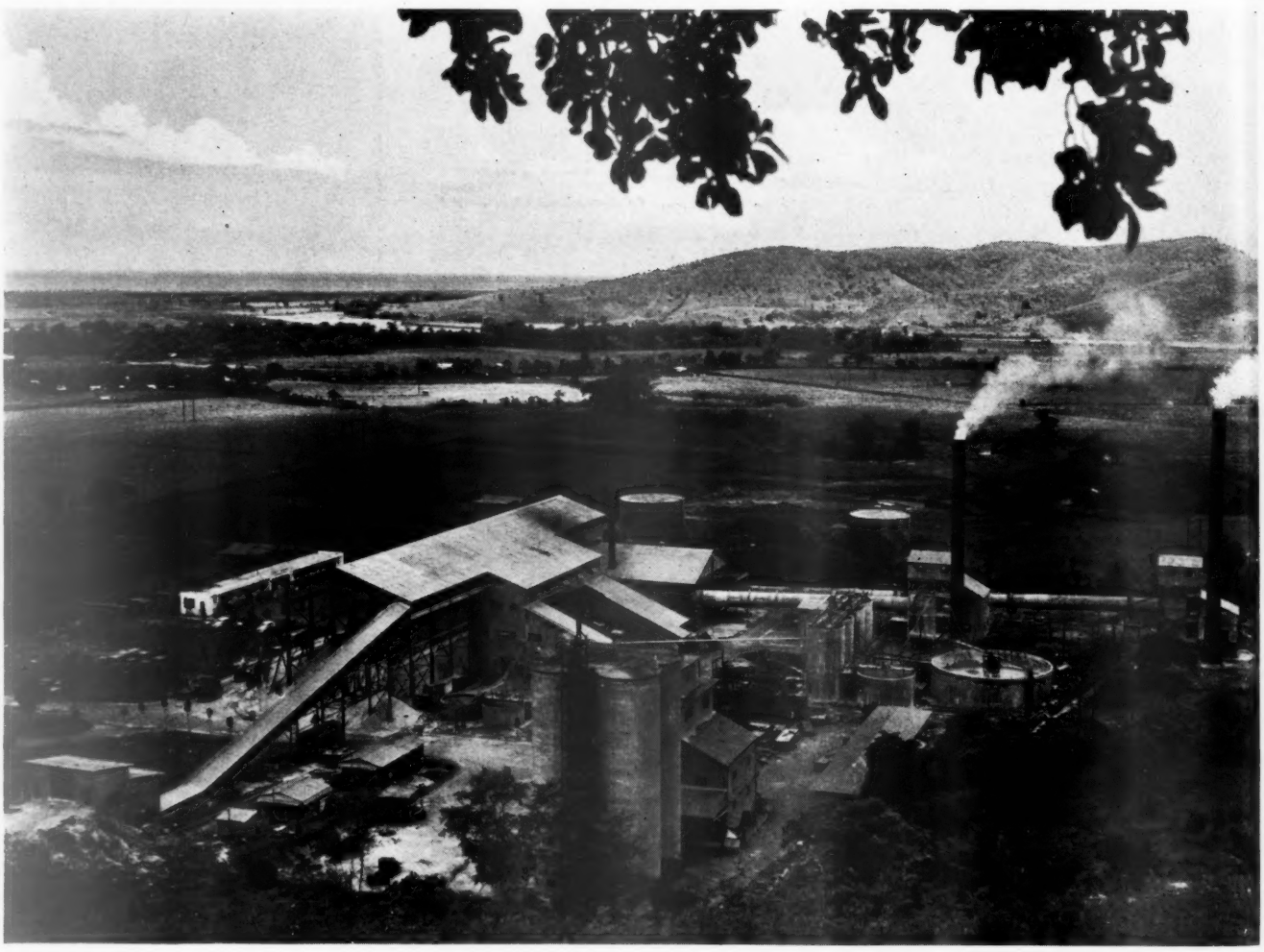
The final concentrates from the Wilfley table go to a sump from which they are pumped by a 2-inch Wilfley to screens for wet separation. The plus-80-mesh overflow and the

(*Continued on page* 62)

Some of the 56-inch Fagergren rougher cells.

The 5- by 10-foot rod-mill with flotation cell and rake classifier.

# New Puerto Rican Cement Plant Makes Notable Contribution to War Effort



The completed plant as of May 31, 1944, viewed from the limestone quarry. The limestone crushing plant is at the left in the foreground.

**By LUIS A. FERRE**
Treasurer and Chief Engineer
Ponce Cement Corporation

another P-Q exclusive

THE cement plant of the Ponce Cement Corporation is situated about two miles outside the limits of the City of Ponce, Puerto Rico, and approximately five miles inland from the Caribbean Sea and the excellent port of Ponce through which its cement shipments are made to the Caribbean area.

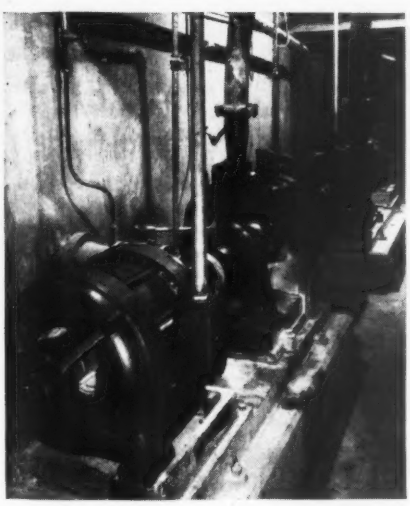
The plant is entirely owned by two of the pioneer industrial families of the island of Puerto Rico, the Roig family from the city of Humacao, who have been in the sugar industry for generations, and the Ferre family from the city of Ponce who have been in the manufacturing industry for over 25 years.

The idea of this cement plant had been contemplated by both the Ferre and the Roig families for several years but the time had not yet been deemed opportune for its installation. When the war in Europe broke out and a large amount of military work was begun in the island of Puerto Rico, it was immediately obvious that a large amount of cement would be required to satisfy both civil and military construction requirements and in December, 1940, it was decided to go ahead with the installation of a 1,000-barrel per day plant. A loan of $325,000 was requested from the Reconstruction Finance Corporation and the endorsement of the Army and Navy in Puerto Rico was sought for the installation of the plant. The Army and Navy, who were then in need of a large amount of cement of specifications SS-C-206 (a) not available then in the island, gave the project their endorsement and with the priority obtained and the loan granted by the Reconstruction Finance Corporation, the Porto Rico Iron Works of Ponce was awarded the contract for the design, supervision and erection of the plant. Jose A. Ferre, vice-president and Luis A. Ferré, vice-president and chief engineer of the Porto Rico Iron Works, went to the mainland in June, 1941, to purchase the necessary equipment for the plant. In New York they contracted for the services of A. P. Hachtmann as consulting engineer. All the equipment was purchased by July 15, when the party returned to Puerto Rico.

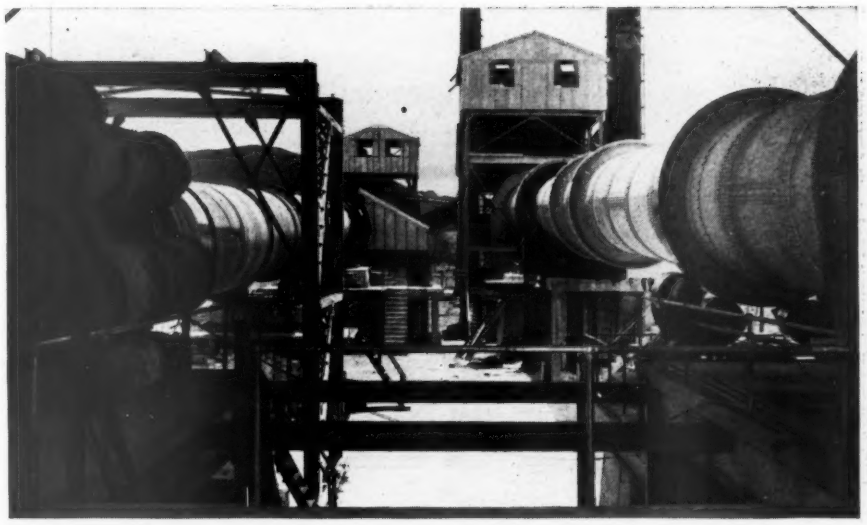
Ground was broken at the plant

site on August 12, 1941, and on August 22, 1942, the plant was inaugurated in spite of the fact that several shipments of equipment and machinery were sunk by enemy action during that period.

**Early Difficulties** The equipment sunk consisted of one 600-horsepower motor, the kiln drive, the fuel-oil-burning equipment, several reducing gear motors, chain drives, motor-generator sets, the main switchboard and other miscellaneous items. Fortunately the Porto Rico Iron Works had a well-equipped foundry, plate and machine shop located in Ponce, in which plant all the miscellaneous structural work, tank work, etc. for the plant was being manufactured. When it was obvious that replacement units would not be available on time for the required completion to deliver cement to the armed forces, the Porto Rico Iron Works proceeded to make temporary equipment using sugar-mill gears for the kiln drive, cutting the kiln-drive master pinion made up of 2-inch plate circles riveted together in a standard hand-operated shaper, casting the bearings in its local foundry, turning its shafts from old sugar-mill shafts, using automobile transmissions as substitutes for reduction gear motors, using old Mack chain drives as substitutes for the lost roller chains, etc. in such a manner that all the losses were replaced with temporary or semi-permanent units to complete the plant. The 240-volt d.-c. motor-generator sets were made from old d.-c. motors converted into d.-c. generators, the main switchboard was made up with locally obtained safety switches, indicating instruments, oil circuit breakers, etc., most of them second-hand, and the plant commenced operation at the required time to make delivery of the 206a cement required for the large Army and Navy construction program which was then under way.



The 4-inch slurry pumps.



The 330-foot kiln on the left and the 180-foot kiln at the right of it.

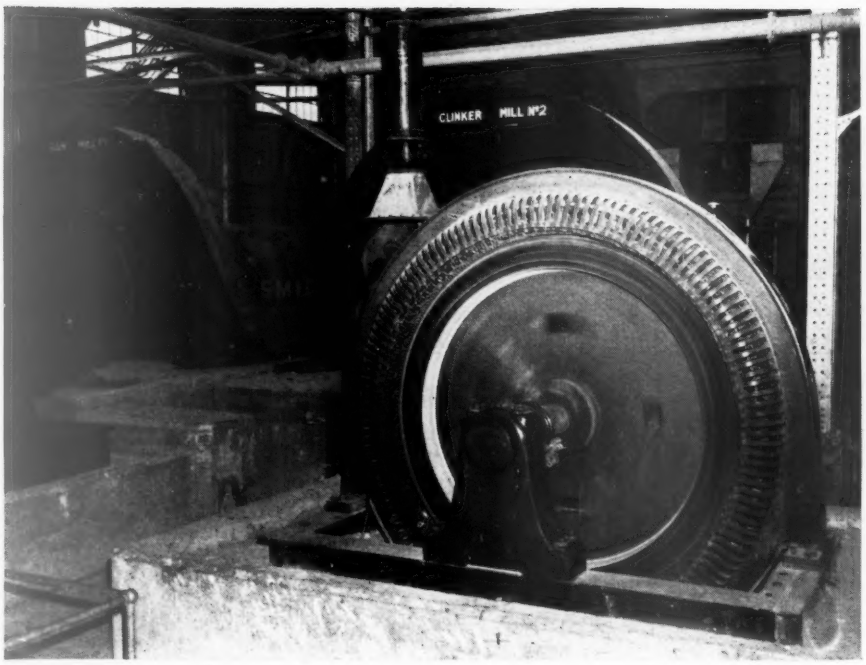
View in the limestone quarry with the plant in the background.

**Original Capacity Increased** Before completing the original unit both the Army and Navy indicated that the plant capacity of 1,000 barrels was altogether too small for their requirements and Lt. Col. Donald S. Burns, district engineer of the Caribbean Area, gave it as his opinion "that not only is the acquisition of an additional kiln desirable but it is absolutely necessary if necessary war construction is to continue in Puerto Rico."

In view of this urgent need and wishing to co-operate with the war effort to the best of their ability, the directors of the company decided to proceed with the installation of a new kiln to expand the plant capacity to 2,500 barrels of cement per day. An additional Reconstruction Finance Corporation loan of $425,000 was obtained and the necessary private capital was injected into the company to complement the amount required for the plant extension.

Since the plant had been originally laid out for an ultimate capacity of 2,500 barrels, it was not difficult to fit in the new equipment to increase the plant rating. A new kiln together with a new grinding mill and an air-separator were ordered and construction work was continued.

The war situation rapidly changed and it was impossible to obtain the prompt delivery required on the new kiln which had been ordered from F. L. Smidth & Company. The Porto Rico Iron Works then decided to purchase the necessary bending rolls to fabricate the kiln in its own shops and an agreement was arrived at with the Smidth company which sent down its inspectors to supervise the fabrication work. The kiln was




The 600-horsepower synchronous motor that drives clinker mill number 2.

fabricated in the shops of the Porto Rico Iron Works and its installation was completed on March 16, 1944.

The air-separator and the new mill were also installed and the whole plant was completed and in full operation on May 31, 1944.

The company has title to a property of approximately 300 acres of land of which 200 acres comprises limestone deposits and 100 acres clay deposits.

The plant is located next the Ponce-Adjuntas road and all its cement deliveries are made by means of trucks and semi-trailers. The water supply for the plant is obtained from two Pomona deep-well pumps, 240 feet deep with a capacity of 1,000 g.p.m. each. One of these pumps is a spare. They supply the 70,000-gallon water tank on the hillside which maintains a constant pressure in the pipe lines. All the water from bearing coolings and mill coolings is used for irrigation purposes since the company runs its own Victory farm of approximately 20 acres to supply farm products to its employees.

**Limestone and Sand** The limestone deposits consist of hills approximately 500 feet high of soft white amorphous limestone varying in carbonate content between 84 and 98 per cent. On the top of the limestone hills there is a deposit of silica sand containing over 90 per cent. pure silica which is available to make special cements. The silica-sand deposit is approximately 100 feet deep and extends over an area of 8 or 10 acres. It is covered by a layer of limestone.

The quarrying of the limestone is done by means of a ¾-cubic yard Lorain Diesel-operated shovel and eight 3-cubic yard White dump trucks. With this equipment approximately 1,000 tons of limestone is quarried every 8 hours. A very small amount of secondary shooting is required due to the soft character of the limestone which makes possible quarrying almost exclusively with the shovel itself. All the overburden, which varies between 4 and 12 inches in thickness, is used in view of its composition, therefore, no stripping is required. This same equipment is used to quarry the silica sand at the sand deposit. The chemical analyses of these two raw materials follow:

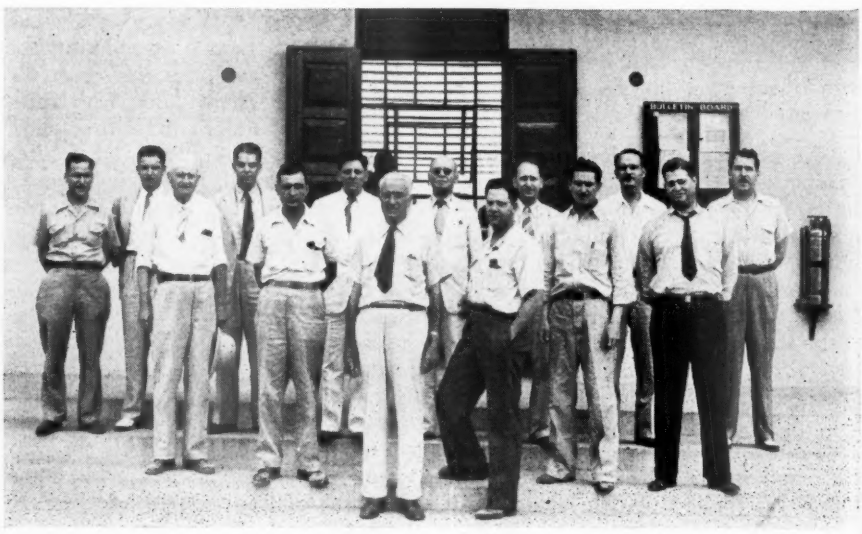
| Limestone | | Sand | |
|---|---|---|---|
| $SiO_2$ | 6.44 | $SiO_2$ | 90.56 |
| $Al_2O_3$ | 2.01 | $Al_2O_3$ | 1.84 |
| $Fe_2O_3$ | 1.65 | $Fe_2O_3$ | 1.19 |
| CaO | 48.96 | CaO | 3.06 |
| MgO | .48 | MgO | 0.14 |
| Loss | 40.39 | Loss | 2.80 |

**Clay** The clay deposit extends about 25 feet in depth and is in flat ground about 2,000 feet from the wash-mill. The clay is quarried with an HD-7 Allis-Chalmers Diesel crawler tractor with a Hough loader. This same unit quarries the clay from the deposit and loads it in the dump trucks. When the daily amount of clay is quarried the Hough loader is replaced with a bulldozer attachment on the same tractor and the same unit shovels the clay from the clay dump into the wash-mill where it is dissolved with water.

The wash-mill is an American 26-foot-diameter Allis-Chalmers machine driven by a 75-horsepower slip-ring motor through a reduction gear. The clay slip flows by gravity into an agitating storage basin 20 feet in diameter from which it again flows by gravity into two 20-foot diameter by 10-foot height agitating storage tanks whence it is circulated by 4-inch Wilfley pumps to the clay-slip feeder that feeds the slurry mill. The analysis of the clay is:

| | |
|---|---|
| $SiO_2$ | 53.16 |
| $Al_2O_3$ | 18.71 |
| $Fe_2O_3$ | 9.25 |
| CaO | 3.71 |
| MgO | 4.02 |
| Loss | 10.78 |

**Iron Ore and Gypsum** The iron ore is used to produce our moderate-heat cement and is obtained from a leased property approximately 10 miles



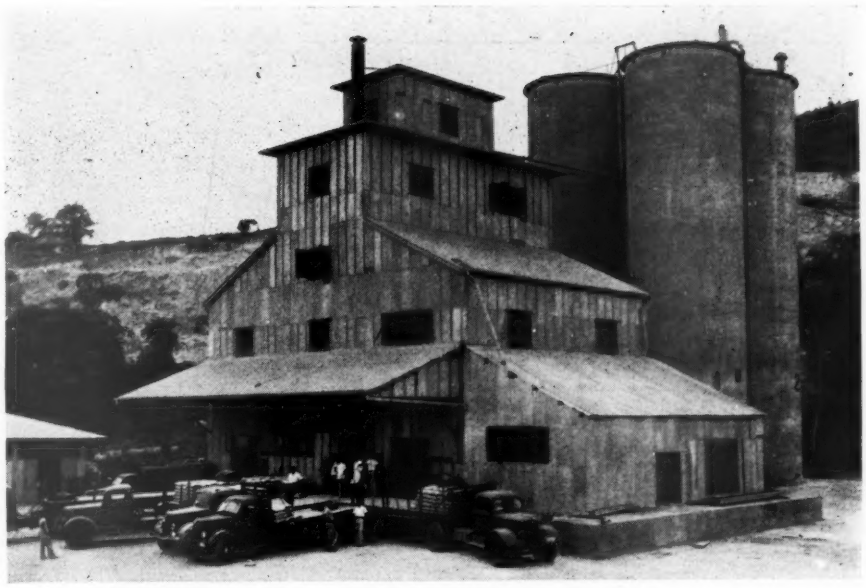

The directors of the company and chief operating personnel. The author is second from the right in the back row.

away from the plant. The gypsum is imported from Santo Domingo where a large deposit is available. The analysis of the iron ore follows:

| | |
|---|---|
| $SiO_2$ ..... | 8.60 |
| $Al_2O_3$ ..... | 8.75 |
| $Fe_2O_3$ ..... | 80.96 |
| CaO ..... | 0.57 |
| MgO ..... | 0.84 |
| Loss ..... | 0.82 |

**Limestone Production** The limestone is dropped directly by the dump trucks into a steel hopper which discharges into an apron-feeder 42 inches wide supplied by the Webster Manufacturing Company and which is driven by a 20-horsepower Allis-Chalmers slip-ring variable-speed motor. The apron-feeder discharges directly into a Penn Primary hammer-mill, which is driven by a 300-horsepower, 720-r.p.m. Allis-Chalmers synchronous motor and has a capacity of 125 tons of limestone per hour. The hammer-mill is installed over a concrete tunnel so that the ground material is discharged directly on a belt-conveyor 30 inches wide which carries the crushed limestone direct to the storage building. There it is discharged through a traveling tripper into the raw-material bin supplying the mill or into the storage building proper. Both the tripper and the belt-conveyor were supplied by Stephens-Adamson. The conveyor is 400 feet long and is driven by a 20-horsepower reducing gear motor.

**Storage Building** The storage building is 60 feet wide, 60 feet high to the crane rails and 286 feet long. It is of steel construction, designed to withstand hurricane stresses and it is covered with galvanized iron. It is served with a Pauling & Harnischfeger traveling crane of 3-cubic yard capacity which is operated at 440-volt a.-c. Limestone, sand, iron ore, gypsum and clinker are stored in the same storage building but are separated by concrete walls.

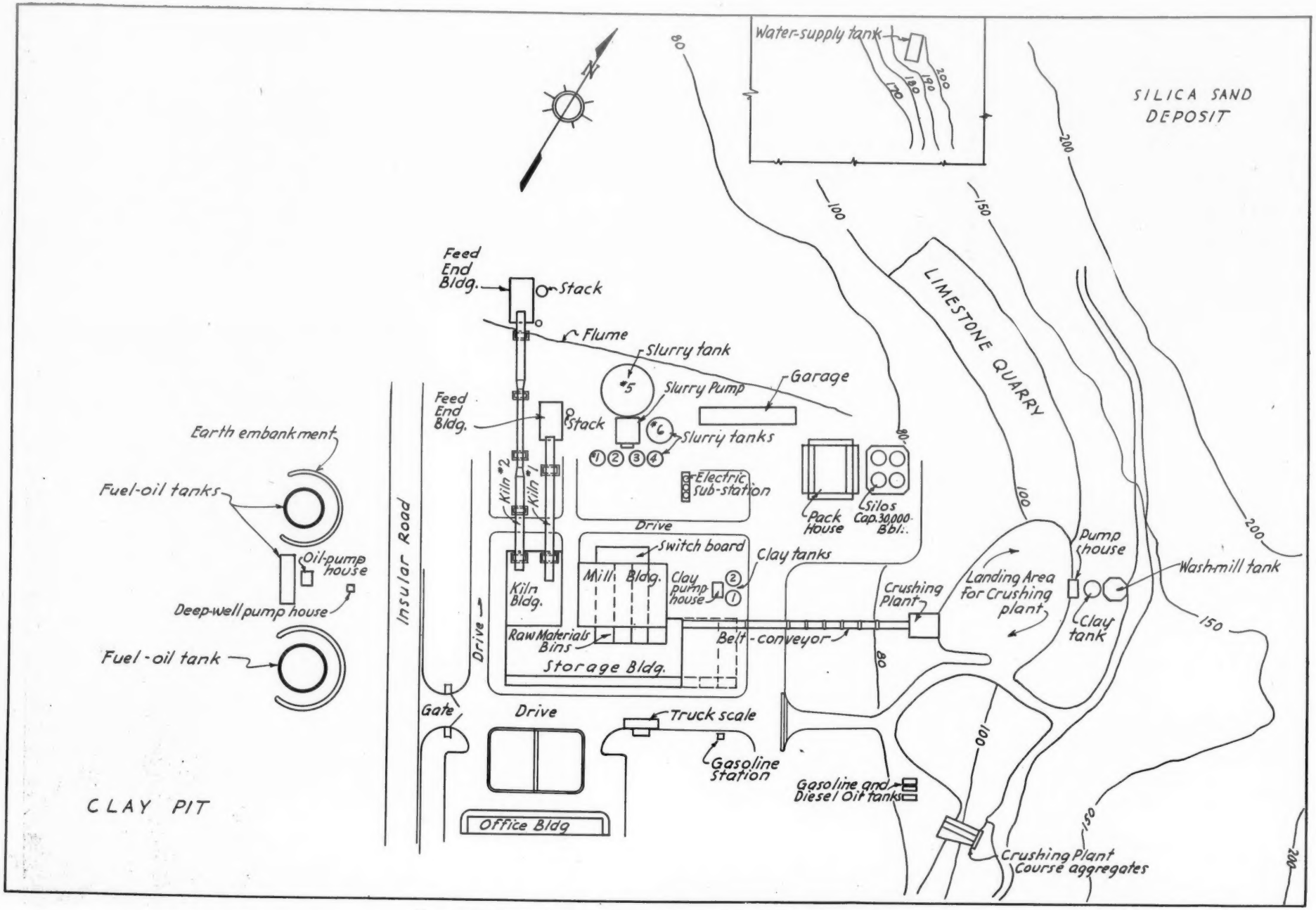


The pack house and cement storage silos.

**Raw-Grinding Department** The plant uses the wet process and grinds all its raw materials in a No. 2288 three-compartment Smidth ball-mill 7 feet in diameter and 29 feet long driven by a 600-horsepower Allis-Chalmers 2,300-volt 0.8-power factor synchronous motor. The limestone and sand are fed through two 20-inch heavy-duty Schaffer Poidometers and the iron ore is added by means of a Syntron vibrating feeder. The clay is fed by means of a clay-slip feeder supplied by Smidth. There is a spare duplicate ball-mill which can be used either for slurry or cement grinding as required. The capacity of this mill with our raw materials is 3,000 barrels of slurry per 24 hours with a moisture content of approximately 38 per cent. The slurry leaving the grinding mill flows by gravity into a sump whence it is pumped into the blending tanks by means of two 4-inch Wilfley pumps driven by 40-horsepower motors, one of which is a spare.

**Blending Tanks** The blending tanks consist of four concrete units 20 feet in diameter and 20 feet deep whose bottoms are located 20 feet above floor level. They have Dorr mechanical-and-air agitators. The air is supplied from three reciprocating 14- by 11-inch horizontal single-stage Chicago Pneumatic compressors driven through V-belts by 75-horsepower motors and rated at 477 c.f.m. each with a discharge pressure of 50 pounds. The slurry is distributed into the four blending tanks by means of a very simple distribution mechanism which was designed and built by the Porto Rico Iron Works when the Merco-Nordstrom plug valves ordered for the slurry pipe line were lost in transit due to enemy action. This was supposed to be a temporary item but it has operated so successfully that we have decided to retain it permanently. One of the tanks is kept filled with a high-lime slurry which is circulated by means of a 5-inch Wilfley circulating pump for correction into the tank which is being filled with slurry directly from the grinding mill. When the slurry has been corrected in the blending

View in the sand quarry above the limestone hill.

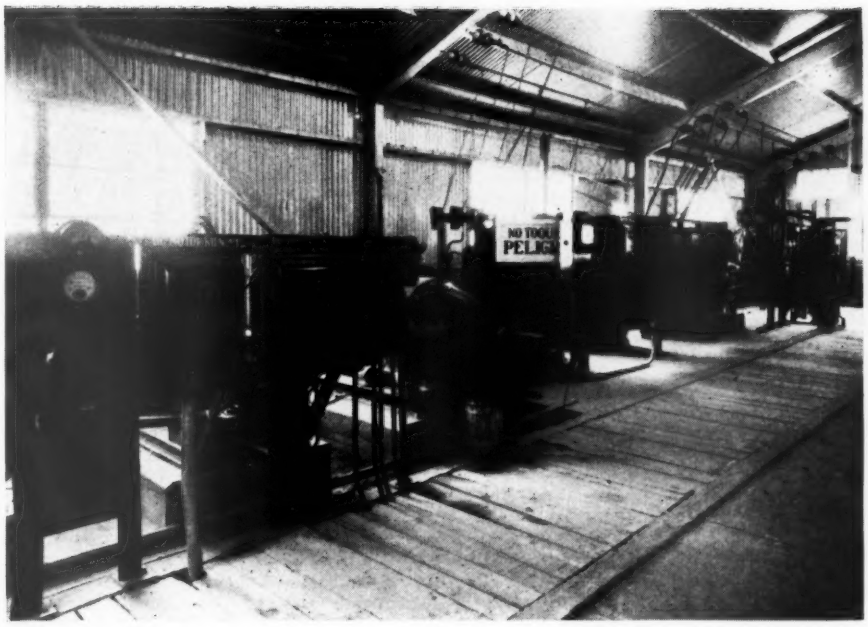



General layout of the Ponce Cement Corporation plant in Puerto Rico.

tank it flows by gravity into two storage tanks, one of them 30 feet in diameter and 20 feet deep with a capacity of 1,400 barrels and the other one 65 feet in diameter and 20 feet deep with a capacity of 6,000 barrels. Both these storage basins have Door agitators. This large storage capacity enables the plant to maintain a very uniform quality in its product.

The slurry from the two storage tanks is sent to the two kilns by means of four 4-inch Wilfley pumps which are driven by 50-horsepower motors and are located in a pit and fed by gravity from the tanks. Two of the pumps are spares.

The 4-spout valve-bag packer and belt run-out conveyor.



Temporary switchboard improvised to replace equipment sunk at sea.

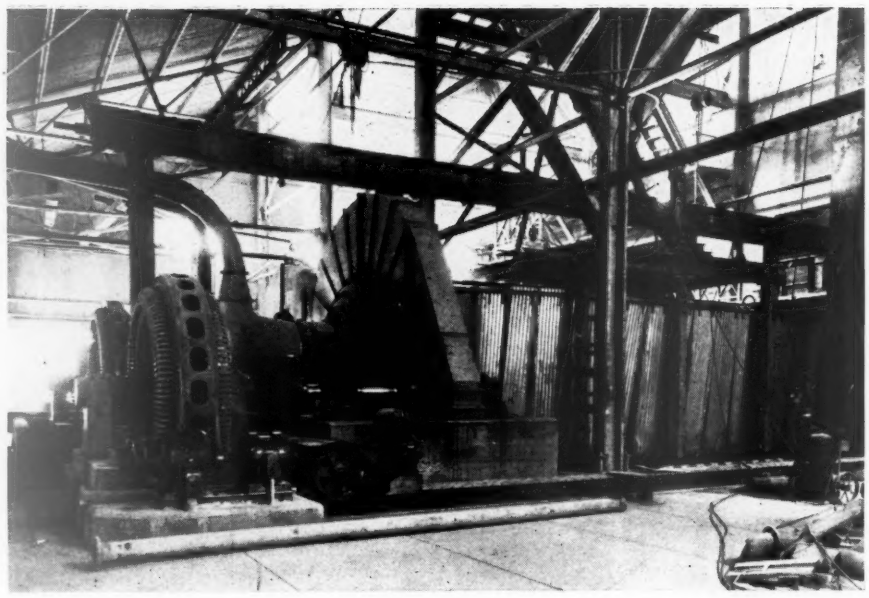
**Kilns** Two rotary kilns constitute the burning equipment of the plant. One is a straight kiln 9 feet by 180 feet long manufactured by Traylor. The kiln is lined with 6-inch brick throughout its calcining zone and is fitted with a Smidth chain system 44 feet long for heat recovery. The brick lining in the chain zone is 4 inches thick. All the brick was supplied by the General Refractories Company. Arco 70 brick is used in the calcining zone.

Kiln No. 1 discharges the clinker into a Fuller movable-step-grate quenching cooler which has a capacity of 1,200 barrels of clinker per day and cools the clinker by means of a flow of air through the grates from a forced-draft fan, which air with the recovered heat is then used for secondary combustion in the kiln. The cooler discharges the clinker into a drag-chain conveyor, which discharges into a clinker elevator whence the clinker is dropped into the storage building. The drive for this kiln was lost in transit due to enemy action and the Porto Rico Iron Works fabricated a new drive for this unit, as mentioned earlier in this article. The power is supplied by a 50/60-horsepower d.-c. motor connected through a V-belt drive. This kiln operated last year with less than 5 per cent. lost time and produced over 400,000 barrels of clinker. The kiln gases are discharged into a dust collector which is made of plate steel and lined with fire brick and discharges through a louvre damper operated by remote control from the firing floor into a Smidth No. 30 induced-draft fan driven by a 50-horsepower motor through a V-belt. The fan discharges into a steel stack 8 feet in diameter and 135 feet high. The dust chamber, flue connections, the steel building which houses this equipment and the steel stack were all fabricated in the shops of the Porto Rico Iron Works.

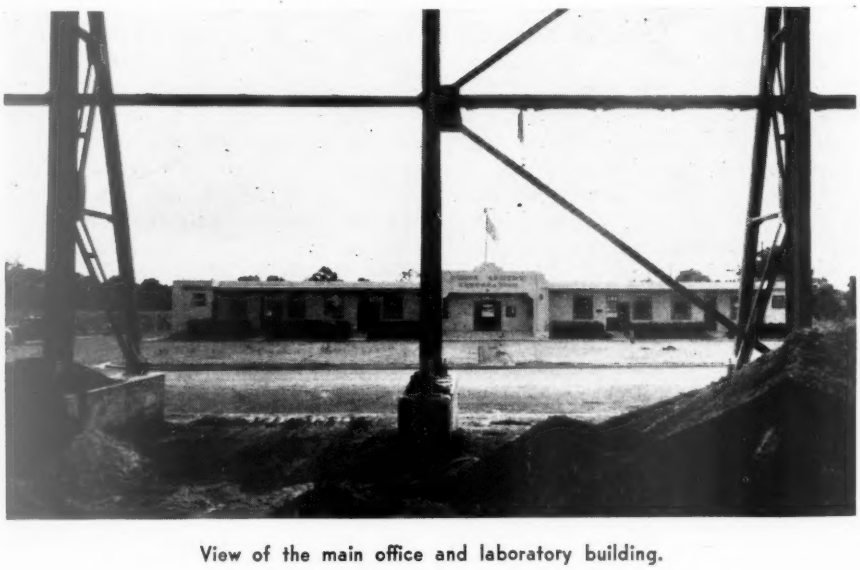
Kiln No. 2 is a Unax and is of the hour-glass design with a contracted section in the center. The discharge and feed ends are 9 feet 2 inches diameter and the contracted section is 8 feet 2 inches in diameter. The length is 324 feet. The kiln is lined with a General Refractories refractory brick lining and the contracted section is insulated with a 3-inch layer of magnesia blocks supplied by Johns-Manville. The kiln has 9 Unax coolers which are attached to the discharge end and discharge through the bottom into a drag-chain conveyor which in turn discharges into an elevator whence

The four 20-foot diameter by 20-foot high blending tanks.

General layout of the Ponce Cement Corporation plant in Puerto Rico.



The number 3 clinker mill, 8 feet in diameter by 33 feet long, with 800-horsepower synchronous motor.



View of the main office and laboratory building.

the clinker is carried into the storage building. The kiln is direct-driven by a triple-reduction gear supplied by the Smidth company and the power is supplied by means of a 50/60-horsepower d.-c. variable-speed motor controlled from the firing floor.

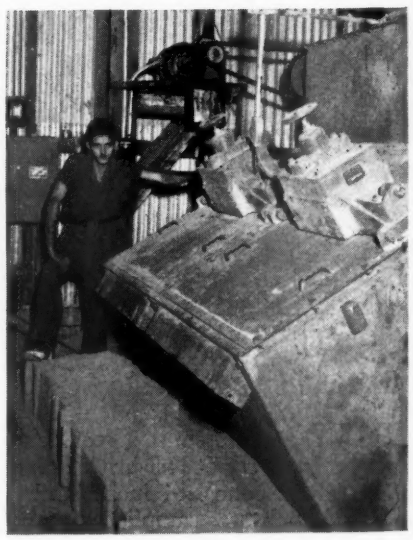
Both kilns have gasoline engine emergency drives which can be used in case of a power shutdown. Both kilns use Bunker "C" fuel oil, which is preheated in Smidth multiple-pass steam heaters operated at approximately 300 pounds pressure. The steam is supplied from two 30-horsepower vertical steam boilers operated with mechanical atomizing fuel-oil burners.

Fuel oil is imported through the port of Ponce from Venezuela and Aruba and is first stored in a 1,000,000-gallon tank at the unloading station next the pier. From there it is trucked into the two fuel-storage plant tanks with a total capacity of 1,000,000 gallons. Thence it is forced by means of Roper rotary pumps to the service tanks located at the plant proper.

Kiln No. 2 discharges the flue gases at about 400 degrees F. into a brick-lined steel-plate dust chamber which discharges through a louvre damper into a Smidth No. 33 induced-draft fan which blows through a steel-plate flue connection into a self-supporting steel stack 8 feet in diameter and 150 feet high. The steel building at the feed end, the dust chamber, flue connections and the self-supporting steel stack were also fabricated at the shops of the Porto Rico Iron Works.

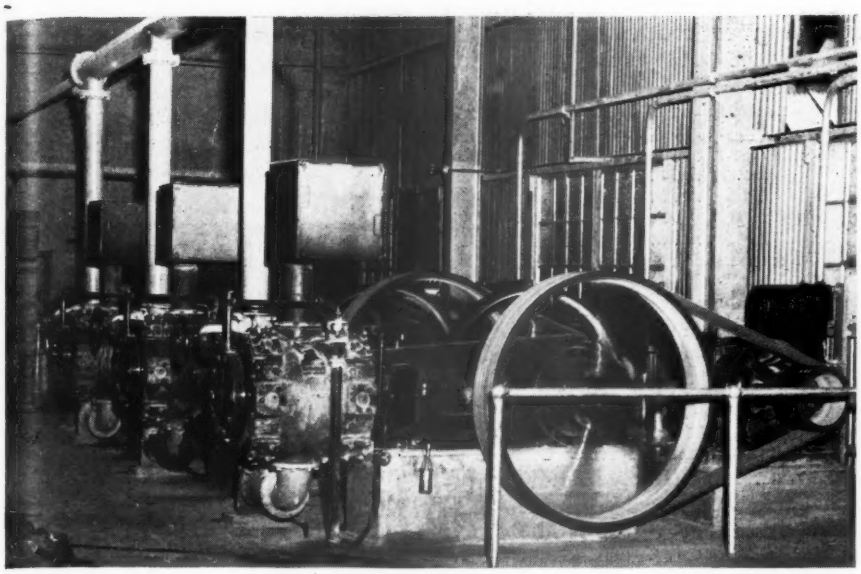
The Smidth scoop kiln feeders are driven by synchronous motors which are synchronized with the kiln motor to insure a constant ratio of kiln speed to feeder speed, any variation in the kiln speed causing a corresponding variation in the feed at a predetermined ratio.

The control panel for both kilns was supplied by Smidth and is installed on the firing floor facing both kilns. Kiln No. 1 has a Foxboro air-flow meter to measure the amount of air supplied to the clinker cooler and a thermostatic grate-speed control to maintain the clinker temperature uniform. It records the outlet temperature for the flue gases and the temperature at the induced-draft-fan inlet and is arranged for the installation of a radiation pyrometer to record the temperature at the burning zone. It also has indicating instruments for kiln speed, kiln revolutions, d.-c. voltage and ammeters for the primary air blower, induced-draft fan and kiln motor. The fuel-oil temperature, pressure and flow are also recorded by means of a recording flow meter. Kiln No. 2 has the same instruments as Kiln No. 1 but in addition has a $CO_2$ and $CO$-$H_2$ recording and indicating instrument which is used to maintain the combustion of the kiln at its most efficient point.



One of the vibrating screens.

**Clinker-Grinding Department** The clinker is picked up by means of a clam-shell bucket installed on the storage building traveling crane and dropped into a reinforced-concrete raw-material bin whence it is fed into the grinding mill through a 20-inch heavy-duty Schaffer Poidometer. The gypsum, which is ground in the same hammer-mill that grinds the limestone and is conveyed into the storage building through the



The three horizontal air-compressors.

belt-conveyor and tripper, is also stored in another compartment of the raw-material bin and is also fed through another 20-inch Schaffer Poidometer to the grinding mill.

In order to obviate the troublesome system of a gate valve under the bins in the discharge hopper, our technical staff devised a very simple arrangement by means of which pieces of ¾-inch standard pipe can be rolled between the discharge from the bin hopper and the receiving hopper located on the top of the Poidometer, by means of which the flow of raw material can be completely stopped for any repair work. The removal of the pieces of pipe is a very simple operation which does not require any of the hammering that usually accompanies the opening of gate valves under pressure.

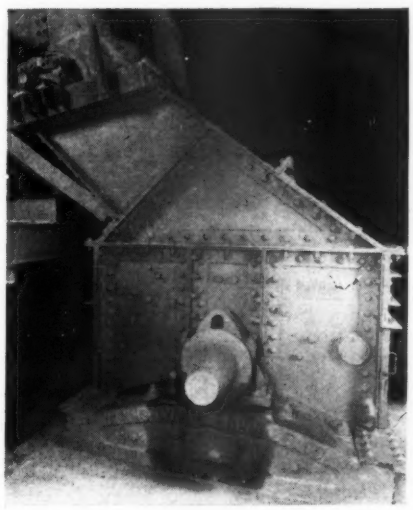
The grinding mill is a Smidth 2411 three-compartment machine 8 feet in diameter and 33 feet long. It operates in closed circuit with a 16-foot diameter Raymond double whizzer mechanical air-separator. The mill is driven by a 800-horsepower Allis-Chalmers 2,300-volt unity-power factor high-torque synchronous motor and the air-separator has a 75-horsepower Allis-Chalmers induction motor. The elevators and screw-conveyors that convey the cement from the mill to the separator were supplied by Stephens-Adamson. The fineness of the cement obtained can be very conveniently regulated by means of this air-separator. The guaranteed capacity of this mill when grinding 206(a) cement with a surface area of 1,800 is 2,311 barrels. For standard cement with a lower surface area the capacity will be accordingly increased.

The cement discharged from the air-separator is carried through a screw-conveyor to 5-inch Fuller-Kinyon pumps which operate with Fuller C-100 rotary air-compressors. The cement is transported through a 6-inch pipe to the storage silos which are about 400 feet away.

The grinding mill is provided with an individual Sly bag-type dust-collector which draws sufficient air through the mill to eliminate any dust nuisance in the mill room and also helps to keep the mill-discharge temperature down. The collected dust is discharged into the mixing screw ahead of the Fuller-Kinyon pumps where it is blended with the cement coming out from the air-separator. The capacity of the dust collector is 2,970 square feet of bag surface and 4,300 cubic feet of air per minute at 7-inch static pressure.

**Cement Storage** The cement storage consists of four 21¼1foot-diameter cylindrical concrete silos with one interspace bin with a total capacity of 30,000 barrels. The silos are 84 feet high and were built on the top of a reinforced-concrete spread footing after careful investigation of soil conditions. Careful observation has shown a maximum settlement of only ⅞ inch in almost two years. The silos were designed and built by the MacDonald Construction Company. The bin bottoms are conical in shape and are of welded steel plate. The cement is discharged from the bins by means of an air-ejector system of our own design which transports the cement from the silos to the packing plant through a 6-inch pipe line. The ejector system is supplied with air by a Fuller C-100 rotary air-compressor. The silos are arranged for bulk loading also.

**Pack House** The pack house is equipped with two 4-tube Modern valve-bag packing machines with automatic weighing scales, complete with a sliding seat for the operator. The filled bags drop directly into a 30-inch woven-wire conveyor located above a steel-plate hopper which discharges into a spill conveyor. Over each packer is a steel hopper which is fed from a central supply bin through a rotary valve and two screw-conveyors. The hopper installed directly above the packing machine is kept full by means of an overflow at the end of the screw-conveyor which feeds the hopper in such a manner that all the excess cement drops down into the spill conveyor located at floor level. All the cement returned from this overflow, plus whatever cement drops through the woven-wire belt-conveyor, drops into a bucket-elevator which returns all the spilled cement to the stream of cement which is being fed through the 6-inch pipe from the silos into a 6-foot single-surface inclosed Tyler



The primary hammer-mill.

Hum-mer electric vibrating screen with a capacity of 600 barrels per hour. The screen separates all the lumps or other refuse which may have fallen into the spill conveyor.

The woven-wire conveyors in front of the packers are driven independently and can be reversed so that they can operate in the same direction or in opposite directions. At a right angle to the woven-wire conveyor is installed a portable belt-conveyor, which extends through a door into a loading platform where the trucks take the cement directly from the belt-conveyor. One machine alone has filled cement at the

rate of 300 barrels per hour. All the conveyors and elevators in the pack house are connected to a Sly dust-collector which has a capacity of 10,000 cubic feet of air per minute and maintains the entire system under a negative pressure, thus preventing any dust in the pack house.

**Electric Power** All the electric power is supplied from the hydro-electric system of the Puerto Rico Water Resources Authority and is received at the plant at 37,000 volts, 3-phase, 60-cycle. The plant substation consists of three 1,000-kv.-a. 3-phase transformers, one of which is a spare, which reduce the voltage to 2,300. A 2,300-volt underground line carries the power into the main switchboard, where a second bank of three 333-kv.-a. transformers reduces the voltage to 440 for auxiliary motors. The mill motors and the hammer-mill motor operate on 2,300-volt current. All the motors and starters for the plant were supplied by Allis-Chalmers and the switchboard was supplied by Westinghouse. A new switchboard to replace the temporary one installed due to the loss of the switchboard ordered originally has already been installed.

**Laboratory and Office** The laboratory and office building is a reinforced-concrete structure 16 feet wide and 160 feet long. It has a constant-temperature air-conditioning unit in the physical laboratory to maintain the temperature at 75 degrees F. and the relative humidity at 60 per cent. It has a Wagner turbidimeter, an autoclave, a Southwark Emery 90,000-pound-compression testing machine, one Tinius Olsen tension machine and all other necessary accessories for complete physical tests.

The chemical laboratory is supplied with all the equipment necessary to handle complete chemical tests of clinker, raw materials and cement.

**General** Due to the close location of all the raw-material deposits and to the excellence of these raw materials this plant is in a position to make cement of any type economically and subject to the strictest requirements. During the first 15 months of operation this plant supplied the Army and Navy with over 300,000 barrels under the strictest requirements for their most important military and naval installations on the island. All this cement was moderate-heat cement according to federal specifications SSC-206Ca. A typical analysis of our cement follows:

CEMENT TYPE SS-C-206(a)

| | |
|---|---|
| $SiO_2$ | 22.66 |
| $Al_2O_3$ | 5.28 |
| $Fe_2O_3$ | 3.82 |
| CaO | 64.95 |
| MgO | 1.51 |
| Loss | 0.56 |
| Specific surface | 1830 |

TEST

| Tensile Strength 1:3 Standard Sand | | Compressive Strength 1:2.77 Graded Sand | |
|---|---|---|---|
| 3 Days | 283 | 3 Days | 1416 |
| 7 Days | 313 | 7 Days | 2266 |
| 28 Days | 423 | 28 Days | 3833 |

The officers of the company are: Antonio Ferre, president; J. Adalberto Roig, vice-president; Antonio A. Roig, director; Luis A. Ferre, treasurer and chief engineer; Jose A. Ferre, secretary; Antonio Roig, Jr., director; Carlos F. Ferre, assistant treasurer; Herman H. Ferre, director; and M. A. Mayoral, assistant secretary.

The main office is located at Real Street, Ponce Playa, Puerto Rico. The co-managing directors are Jose A. Ferre and Luis A. Ferre. Andres Lugo-Viña is business manager in charge of distribution. The plant manager is Oscar Girod who was also construction engineer. Carlos L. Cintron is general superintendent and chief chemist.

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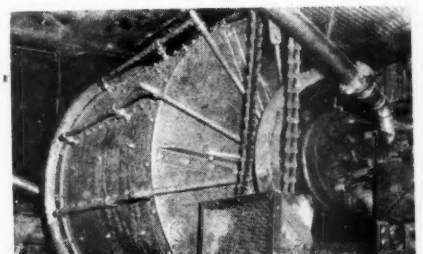
## ● Graphite (*from page 53*)

minus-80-mesh underflow from these screens go to separate thickeners. The overflow from both thickeners is pumped by a 4-inch Wilfley to a tailings disposal pond along with the tailings from the rougher cells and the concentrating table. The clarified water from this pond is pumped to a storage tank for re-use.

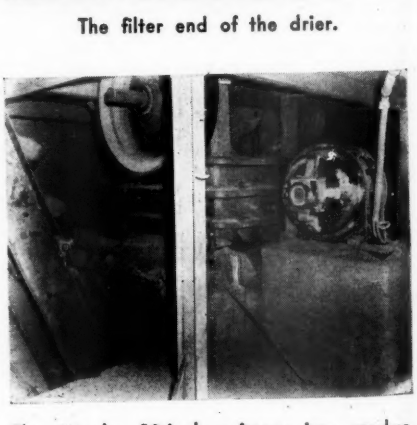
The underflow from either thickener goes by gravity to a Dorrco filter, depending on whether powdered or flake graphite is being made. The filter cake is discharged into two 6- by 42-foot Lowden pan-type driers. These are fired with fuel oil and the heat circulates through the tunnels and around the baffles which heat the hearth plates over which the graphite is carried by a series of mechanical rakes. The dried graphite is discharged over screens which remove any oversize or foreign material. A conveyor carries the graphite to storage bins from which it is loaded into bags for shipment. The St. Regis 5-ply paper bags used have one 50-pound and four 40-pound layers. Each holds 100 pounds or slightly over 2 cubic feet of graphite.

No crucible grades of graphite are made but the flow-sheet can be varied to produce grades containing from 70 to 92 per cent.; pure carbon. Composite samples are made of each ton or 20 sacks and the various grades are segregated and stored in the warehouse. Most of the powdered graphite produced is used to dust mold facings in foundries. The flake graphite is used in the manufacture of lubricants, brake linings, etc. Sales are made exclusively through the Eastern Graphite Sales Company, Asbury, New Jersey.

Some of the pumps which handle the tailings.



The filter end of the drier.



The 18- by 30-inch primary jaw crusher, with elevator to scalping screen.

# TAXATION . . a Year 'Round Operation Problem

UP to now the pit or quarry operator has considered his income tax only around filing time but because the current rates are the stiffest in history and destined to go higher, making tax a major expense, it is necessary to consider this impost throughout the year the same as other expenses. When the rates were lower, tax expense did not influence operations to a great extent. The taxpayer figured his net profit at the end of the year, sometimes a few days before March 15. To-day the same practice may bring the sheriff because this tax touches every element of business operation —sales, credits, collections, working capital, budgeting, costs, etc.; consequently, the producer who expects to survive the duration and be in a preferred position to take advantage of the profit possibilities in the post-war period, must analyze every phase of his operation throughout the year in relation to the federal levy on income.

Many pit and quarry operators do not realize that the high tax rate is scrapping old yardsticks, changing ratios that were once considered normal and complicating managerial procedure. These provisions must be given careful thought, otherwise, the result may prove disastrous. If the operator does not give more consideration to income-tax expense, not just as a tax payment, but in regard to its effect on operations, he may find it difficult to do business at a profit, even though all his operating elements are what normally would be considered satisfactory.

Formerly the yardstick of managerial efficiency was reflected in the net profit and then the federal tax was deducted. The net profit was the thing. If it showed a satisfactory return on the investment and the ratio to sales was at least passable, the operator figured he had done a good managerial job. He could figure on crediting a substantial part of the net profit to surplus or net worth because the tax of former years took only a modest portion. Now the net profit cuts so deeply into earnings that he can no longer consider it a reliable yardstick of managerial efficiency, because, after the income tax is deducted, the net will be substantially reduced. "Taxable profit" would be the better term for the difference between sales and over-all costs. The net profit is really what is left after the federal tax is deducted.

Even the operator with a satisfactory spendable profit on paper after the deduction of income taxes, may not have the funds to pay unless he increases his working capital by cutting expenses, discounting his bills, collecting his accounts more promptly, avoiding long-term obligations for the duration, and, in other ways, keeping fixed charges at the minimum. Expense control is of the utmost importance to-day, not only to assure profitable operation but to provide adequate working capital to keep business moving without borrowing and paying interest, thereby increasing expense. The net profit on the profit-and-loss statement does not always indicate the liquid funds available to meet obligations. We have found cases where the net was substantial but the working capital way below par.

Certain expenses, such as advertising, must be viewed in the light of tax deduction. For example, if the operator's net taxable income under the 1943 rates is $5,000, the net cost of $50 worth of advertising would be about $40. If he didn't spend the $50 for advertising, he would have to pay the differential in tax. An operator with $15,000 net income who spent $500 for advertising would get it for about $350. Under the high rates the cost of advertising is greatly reduced. Other expenses may be regarded in the same light. Figure the net cost of outlay after deducting the tax to appraise the value received. An odd way to figure, you say. Brother, you'll have to revise a lot of your figures and opinions to ride the duration and post-war periods.

In pre-war years budgeting one's operations for a forthcoming period was wise business practice. Income tax was never taken into consideration. Now tax is a major expense and should be included in the budgetary figures. It pays to budget, because budgeting is planning, but adjust this essential to war conditions and the new economy. Pro-rate the tax monthly on your budget and when analyzing the results of operations, so that you get a better idea of your spendable profit. In the final analysis you are concerned with the spendable profit, because this is what you can bank after the income tax is paid, hence, you should figure on that objective, no other.

The carry-over and carry-back provisions in the code demand consideration throughout the year. For example, if you had a loss carry-over of $2,400 in 1943, of which only $600 was absorbed in 1944, leaving $1,800 to carry over to 1945, then it is up to you in 1944 to see that the net profit is at least $1,800. Whether you make it or not, you should work toward that objective. If it runs less, the unabsorbed portion can not be carried over to the third year and you lose credit for the difference. This shows clearly that you can't forget your income tax throughout the year, that it is now so clearly entwined with operations that you must consider it an element of operating routine month to month to play safe.

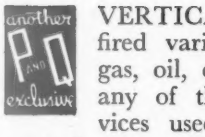
Sales volume will be affected by tax. The rate increases with net taxable income, so those who just go over the borderline to a higher tax level may show a lower spendable profit than those whose volume is near the top of a lower bracket. Obviously, this will destroy the basic principle of business—bigger earnings with bigger volume. The way the tax is levied to-day you may earn less by increasing volume, even though you sell at profitable prices. This may put a damper on sales aggressiveness and hamper the basic force that keeps private enterprise alive.

Credit men and bankers are already giving consideration to the changing yardsticks brought about by high taxes and other war-time restrictions and are revising their methods of business analysis. In the future, when granting credit, the credit man will consider the tax that will be paid on business operations, not only around March 15, but throughout the year, pro-rating this expense per month, a fact that did not inject itself into credit analysis before. Inasmuch as business specialists are already considering the changes that high taxes will superimpose on operating ratios and routine, the pit or quarry operator should also get in line now because the trend will gain momentum fast and he will benefit by early compliance with the change. When granting credit to customers in the future, consider the fact that the

(*Continued on page* 65)

**By ARTHUR ROBERTS**

# VERTICAL LIME-KILN PROBLEMS




**By DR. R. W. ROTHROCK**

VERTICAL lime kilns are fired variously with either gas, oil, coal or wood and any of the measuring devices used for combustion control are applicable to vertical lime-kiln operation. However, the vertical kiln presents perhaps the most difficult problem of control by instrument applications. For example, true flue-gas analysis is difficult in open-top kilns because of natural channels which build up through the stone as loaded into the kiln. Each channel produces a chimney effect in itself and besides there is always a certain down draft from the top. As a result, gas taken for analysis in one section of the kiln may vary considerably in analysis from a sample taken from another section at the same level.

Natural-draft kilns having stacks or kilns using induced draft tend to overcome this by bringing all the flue gases together, thus permitting average sampling to be more accurate.

Vertical-kiln flue-gas temperature, in a manner similar to boiler control, is an index to heat wasted since high temperatures here are as

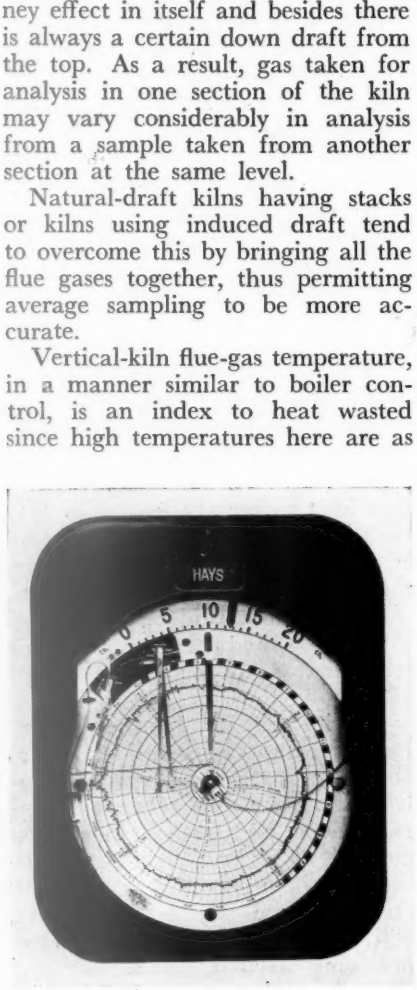



Fig. 1. Recorder-indicator. (Courtesy Hays Corporation.)

indicative of excess air conditions as they are in boiler operation.

Knowledge of flue-gas constituents and temperature is important from the viewpoint of securing most complete combustion. Still the fuel-to-lime ratio may not be the best possible for a given vertical lime kiln, without fairly accurate knowledge of draft conditions as well as flue-gas analysis. Uniformity of vertical-kiln capacity is dependent to a considerable degree upon kiln pressure and, therefore, draft regulation. Changes in kiln pressure may occur from changes in atmospheric or weather conditions, variation in the fuel supply or in the volume of air supplied. Sufficient draft must of course be provided to supply air for combustion. At the same time it must be so manipulated, in conjunction with kiln loading and kiln design, as to cause the flame to be fairly long, as well as to sweep to the center of the kiln and then upward toward the top of the stone column. This does not mean that the draft should be excessive to a degree that the excess air lowers combustion efficiency. However, there should be a regulation that would avoid a short flame or one that would creep up the walls of the kiln.

Among the applicable devices arranged to record the important factors relative to combustion, draft and temperature, Figure 1 shows a type which is suitable for mounting where the record is plainly visible. From such records kiln manipulation may be readily correlated and held at the proper point by the kiln fireman. While considering draft it should be mentioned that a record showing the number and order of cars of stone dumped over a given period can often improve kiln loading. This record can be made by the quarry man or automatically by means of an impulse recorder attached through a switch arranged on the incline track to record each car as it passes the switch.

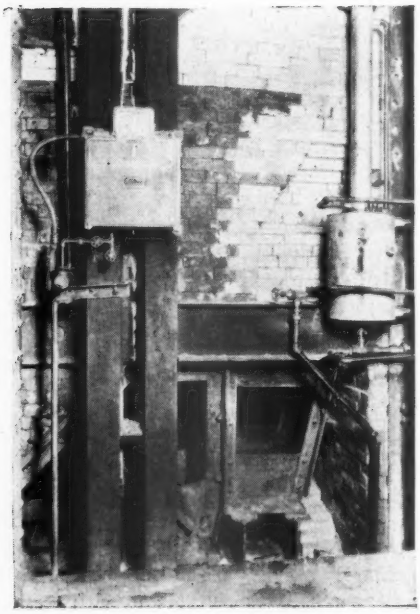


Fig. 2. Automatic draft control on kiln. (Courtesy Leeds & Northrup Company.)

Once a suitable kiln-pressure condition has been established for a given kiln, rather constant effort on the part of the fireman is required to make corrective adjustments. Even so, there are periods when delay in

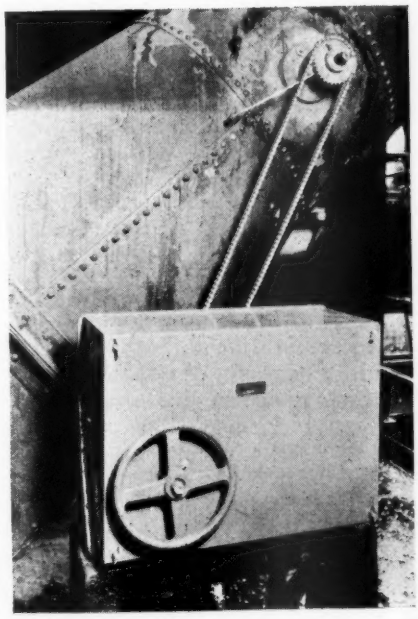


Fig. 3. Automatic stack damper control. (Courtesy Leeds & Northrup Company.)

making adjustments can hardly be avoided. The accumulation of these periods has a considerable effect in reducing kiln capacity.

Automatic draft regulation tends to shorten or eliminate such delays and is not difficult to apply to most types of lime kilns, and therefore should prove a worth-while advantage to vertical-lime-kiln operators. There are several systems available, one of which is illustrated in Figures 2 and 3. These photographs show respectively the controller which requires only suitable pressure taps to the kiln and an electrical connection to operate the damper drive installed at the kiln stack.

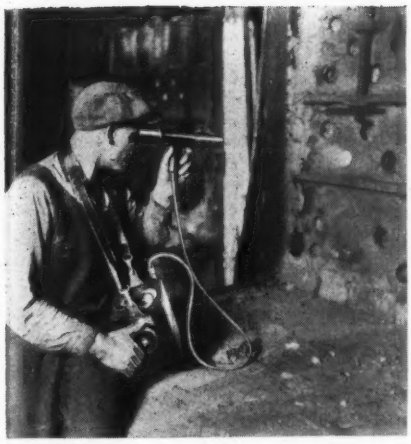


Fig. 4. Determining hot-zone temperature with optical pyrometer. (Courtesy Leeds & Northrup.)

In considering capacity the quality of the product must not be forgotten. This fact brings up again the problem of the control of hot-zone temperatures. The practice has long been to depend wholly upon the eyes of kiln firemen for hot-zone temperature control. More recently some plants have taken advantage of possible aids to the fireman so that he need not depend alone upon his eye but can make a relative check of temperatures periodically by application of the optical pyrometer (Figure 4). The operator needs only to get the proper sight through an opening or the eye of the kiln, and then make easy adjustments which cause the instrument to measure and indicate the temperature of the hot stone.

Another method is shown in Figure 5. In this kiln application, where smoke and dust were thought to interfere with the accuracy of radiation pyrometer records, the observed temperature is that of the end of the glowing tube which is practically the same as that of the inner wall.

As a continuous aid to lime-kiln operators the radiation pyrometer, has similarly been directly applied. This instrument measures and records the hot-zone temperature continuously at the point of application. It provides the kiln operator with a comparative temperature guide and an opportunity for correlation of "cause-and-effect" manipulation of his kiln.

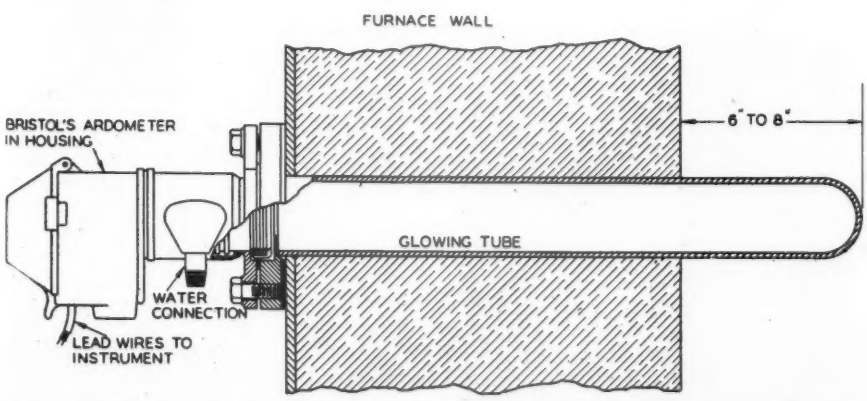



Fig. 5. Radiation pyrometer arranged to avoid effect of smoke or dust by measuring temperature through glowing tube. (Courtesy Bristol Company.)

## Taxation (from page 63)

higher tax rate that must be paid on income may make the credit-seeker less desirable a risk than heretofore.

The income tax law is so full of problems that discussion never clarifies. Amendments have followed amendments willy-nilly; court decisions have twisted the original intent of legislators; the Tax Board of Appeals has handed down hundreds of rulings interpreted in many different ways, even on similar cases; rules and regulations have been piled on top of each other so that the ensemble is a hodge-podge of inconsistency, saying nothing about indirect taxes and other direct levies, federal and state. This is probably the reason why there is always so much argument anent tax, but, like Mark Twain's weather, nobody ever does anything about it. Tax has grown wild in our economic field, creating business erosion, destroying instead of cultivating income because it is unscientifically administered — and the Frankenstein is getting beyond control.

Pit and quarry operators, as a class, have never bothered much about the soundness of our income-tax laws. Up to now they were interested only in the tax they had to pay, but from now on the wise taxpayer will acquaint himself, not only with his tax in dollars, but consider it as it affects his internal operations and external economic conditions, the latter indirectly vital to his well-being. Many contend that the taxation system should be revamped, the federal government to pre-empt the income and corporate tax fields, with a percentage of restitution to the states, likewise, the excise tax field preferably, one flat rate, including income tax, social security, Victory tax, unemployment insurance and probably other federal levies instead of the cumbersome payments and computations now in effect.

## Bureau of Mines Reports Shortage of Kyanite

Domestic production of refractory-grade kyanite in 1943 was adequate for current requirements according to the Bureau of Mines, but a shortage of low-iron, glass-grade, kyanite developed because of milling difficulties at the plant of the Yancey Cyanite Company at Burnsville, North Carolina, the sole domestic producer. This plant ceased operation on January 5, 1944. The Kyanite Products Corporation near Farmville, Virginia with increased plant production and stabilized manpower was able to fill all orders for refractory-grade kyanite without reaching maximum production.

The production of andalusite at White Mountain, Mono County, California by Champion Sillimanite, Inc., decreased slightly from the 1942 level, but the production of dumortierite at Oreana, Nevada by the same company—the only domestic producer of either mineral in 1943, increased. This material was shipped to the parent firm—Champion Spark Plug Company, Detroit, for use in spark-plug cores and other electrical porcelains.

## Sales of Calcium Chloride Maintained at 1942 Level

Despite labor shortages for rural road work, sales of natural calcium chloride (and calcium-magnesium chloride) were well maintained in 1943, reaching 199,796 short tons (75-per cent. basis), valued at $1,549,565, compared with 224,527 tons valued at $1,733,169 in 1942, according to the Bureau of Mines.

Calcium chloride is derived chiefly from three sources, sea-water bitterns, well brines, and by-product liquors of the ammonia-soda process. Producers of the last-named material are not canvassed by the Bureau of Mines, but sales of calcium chloride from that source were estimated at 180,000 tons in 1943, compared with 175,000 in 1942. Probably 90 per cent. of the total calcium chloride available from all sources is thrown away. The amount recovered depends on the market from year to year.

# SENSIBLE POST-WAR PLANNING

Before the war one welder, part time, handled all plant needs. To-day the welding shop is a separate department with three full-time welders. "Like many small companies our size, we have been operating with makeshift substitutes, and getting along with what we could borrow, beg or buy . . . but we have learned that we can get along," says Mr. Roe.

Joe L. Roe (left) superintendent, Victory Sand & Stone Company, Topeka, prepares samples of sand for mailing out to contractors. Mr. Roe believes that post-war planning is more the ability of the individual business to understand its own problems, now, for the duration, and immediately after the war. "What grade of sand and gravel will Victory Sand customers demand for the remainder of 1944? For after the war is over what will a difference in demand mean to us?"

The pictures on this page supplement an article by Mr. Roe entitled "Common Sense Approach to Planning for Post-War Era," which appeared on page 86 of the April, 1944 issue of PIT AND QUARRY.

Mr. Roe explains: "We have stepped-up wire-rope inspections, cleaning and greasing. This has resulted in greatly extending the life of our cables. Then, some years back, we changed to all preformed rope and we find that we are getting nearly twice the rope life we did with non-preformed. And there is less footage loss in resocketing or when a cable breaks. So here we have been doing all along our 'post-war-planning' for the rope account. Had we not initiated the maintenance program and switched to preformed, wire rope would be a stopper for us to-day."

A Victory Sand dump truck is being treated to a course in "applied post-war planning," in the company's shop (below). "Our fleet of dump trucks has passed the profitable operation stage. We need new dump trucks just as soon as they can be bought. But we know that such purchases will not be possible even in early months after the war. So what? Simply this — more attention to repairs, reconditioning, rebuilding, and more careful operation . . . it's no easy solution, but the job can be done."

Mr. Roe (left), explains a machine correction for better operation to group of employees. "In our case we take every operation and double check to see if we can cut costs. . . ."

# Correct Lubrication

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• Very often, *correct* lubrication is the remedy for difficult maintenance due to excessive wear.

For *correct* lubrication of *QUARRYING MACHINERY,* Sinclair provides highly specialized Oils and Greases...lubricants with wear-preventive qualities that help keep maintenance and replacement costs down. Sinclair Ten-ol 200 is especially efficient for Diesel engines and Diesel-powered shovels, buckets, and bulldozers.

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*(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)*

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# PERSONAL MENTION

MYRON L. HYMAN, chairman of the board of directors of the Buffalo Gravel Corporation, has been promoted from major to lieutenant-colonel in England. He served 18 months overseas as an ensign in the Navy during World War I. Receiving his captain's commission in July, 1942, he was made commanding officer of a Base Headquarters and Air Base Squadron, Army Air Base, Ft. Dix, New Jersey. He went overseas several months ago.

C. M. PRICE has resigned from his position as chemical engineer of the Calaveras Cement Company, San Francisco, and has entered consulting practice with Mark Lintz, under the name of Price & Lintz. Offices have been opened at 116 New Montgomery Street, San Francisco 5, where the firm will specialize in chemical and metallurgical problems.

M. G. MOORE, civil engineer long identified with the construction industry has purchased the Cook Stone Company, Hopkinsville, Kentucky.


ORO Supermang REPAIRS

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D. H. Crandell

DEAN H. CRANDELL, director of research for the National Gypsum Company, Buffalo, since 1928 has been made vice-president in charge of research. Much of the credit for the adoption of exterior gypsum building board and roof planks to replace scarce lumber has been due to his efforts in this direction. Its development helped to solve the acute materials shortage in war-construction also, one naval-construction job having saved a reported 700 tons of steel through its use.

GEORGE WILEY, acting chief engineer, has been promoted to general engineer of the Ideal Cement Company, Denver. HAROLD LAMONT, acting superintendent, is now superintendent of the Gulf Portland Cement Company, Ideal subsidiary plant at Houston.

HENRY H. RICHETTE has been appointed manager of the contractor's-tool division of the Independent Pneumatic Tool Company with headquarters in Chicago. He had been manager of contractor-tool sales at Philadelphia. Prior to joining Independent Pneumatic he was a district manager for Johns-Manville Sales Corporation.

ARTHUR D. HART, 60, owner of the Hart Sand & Gravel Company, Auburn, Washington, passed away in May at an Auburn hospital.

JOSEPH L. BLOCK, has returned to his position as executive vice-president of the Inland Steel Company, Chicago, and its subsidiary, Inland Lime & Stone Company, Manistique, Michigan, following his resignation as deputy director of the steel division of the War Production Board in Washington, D. C.

MARCEL A. CORDOVI, formerly research assistant, Welding Research Council of the Engineering Foundation, has joined the metallurgical staff of the Babcock & Wilcox Tube Company as research metallurgist.

GORDON S. McKENTY has been named general sales manager for R. G. LeTourneau, Incorporated, Peoria, Illinois, to succeed Ed. R. Galvin, resigned to accept presidency and a directorship of the Tyson Bearing Corporation at Massillon, Ohio.

G. S. McKenty

Mr. McKenty graduated from the University of Nebraska in 1924 and subsequently served as an engineer in Mexico and China for International Telephone and Telegraph, a task including rebuilding of the entire Shanghai telephone exchange. He was in the Nebraska construction equipment sales field for five years prior to joining LeTourneau in 1935.

Completion of the R. G. LeTourneau, Inc., exclusive distributorship policy, already 70 per cent. fulfilled, is among Mr. McKenty's first assignments as general sales manager.

NEIL C. HURLEY was elected chairman of the board of directors of the Independent Pneumatic Tool Company and NEIL C. HURLEY, JR. was elected president at the company's annual meeting held recently.

MARTHA SEAY of Oakwood, Tennessee, has been employed as an assistant chemist at the Huron Portland Cement Company, Alpena, Michigan.

ELI HARVEY is manager of the recently-formed Kokomo Creek Stone Company, Kokomo, Indiana. The company's quarry is located in Taylor Township.

FRANK BEMIS has been appointed sales manager of the American Cable and Hazard Wire Rope Divisions of American Chain & Cable Company, Inc. He has been with the company since 1938.

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Dudley Rice has been appointed a field engineer in the Chicago district for the Eutectic Welding Alloys Company. He was formerly a sales specialist on the welding products of the American Brake Shoe Company.

# AFTER THE WAR IS OVER

**$433,000,000 for Construction in Michigan** Post-war construction programs of Michigan's cities, counties and state highway department total $433,000,000. Among the more important projects are the John C. Lodge and Crosstown express highways in Detroit. About 10 per cent. of the state's projects have been surveyed and completely planned. — (Charles M. Ziegler, state highway commissioner, May, 1944.)

* * *

**Missouri Cities Will Spend Over $113,000,000** Seventy-eight cities in Missouri are contemplating post-war construction projects totaling $113,000,000. Twenty-two cities are having final plans prepared for projects expected to cost $30,000,000. Twenty-seven cities are ready to call for bids on projects to cost $5,345,000. The 200 Missouri cities outside St. Louis and Kansas City are expected to undertake public-works projects that will total $21,000,000 in the first post-war year in order to furnish their share of post-war employment.—(Citizens' Postwar Construction Council, May, 1944.)

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In choosing a new vibrating screen for your plant, don't overlook these features in design and construction which are built into Plat-O Vibrating Screens to assure you of dependable performance and rock-bottom maintenance costs:
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We've outlined here only a few of Plat-O's money-saving —and money-making—characteristics. You can get all the details by writing for Bulletin 27-A.
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**Income the Key to Housing** " . . . a considerable segment of the American people have *never* been decently housed. Their earnings have never been sufficient to provide a dwelling worthy of the American home ideal. If industry has the courage and the resolution to organize, expand and exploit production so as to raise the income of every willing worker, this housing goal can be accomplished in far less time than we dare to forecast.

"Many of us are aware that the extent to which we fail to meet this challenge will be a direct invitation to the federal government to take over the job which is fundamentally our own.

"For we have moved forever into the zone of social responsibility where rights cease to be abstract, and where every responsible citizen can claim his share of that prosperity which is made possible by the very social organization of which we are all a part."—(Henry J. Kaiser at the Conference on Post-War Housing, Chicago, March, 1944.)

* * *

**St. Louis Sees $60,000,000 of Construction** Authorization for a $36,000,000 bond issue will be presented to St. Louis voters this autumn, and this amount, with sums already available, will make possible the carrying out of $60,000,000 worth of post-war construction. Street and access-highway work, new community facilities, additional airport facilities, sewer additions and remodeling of the city's water-supply system are included in the proposals.—(George C. Smith, St. Louis Chamber of Commerce, at the St. Louis Section meeting of the American Society of Civil Engineers, April, 1944.)

**Iowa County Will Spend $1,073,750** Scott County, Iowa, of which Davenport is the center, reports a program free from spectacular projects but based on definite needs. It provides for grading and resurfacing amounting to $315,000 for 250 miles of secondary roads, using gravel or crushed stone; grading 25 miles of trunk roads and resurfacing with stabilized base and cutback asphalt to cost $168,750; replacing 25 small bridges to cost $375,000 and two other bridges to cost $115,000; and building a county central garage at $100,000.—(J. M. Malloy, county engineer, April, 1944.)

* * *

**Cincinnati's Plans in Blue-Print Stage** More than $10,000,000 worth of post-war construction plans for Cincinnati are already in the blue-print stage. One hundred thousand dollars has been appropriated by the city council to carry on the work of a regional council to be organized to plan for the metropolitan area and more money has been promised.—(Alfred Bettman, Cincinnati City Planning Commission, May, 1944.)

* * *

**$1,500,000,000 Road Bill Reported by House Committee** A new $1,500,000,000 post-war roads construction bill, which follows rather closely the proposals Committee Chairman Robinson offered to the House of Representatives earlier, has been reported out by the House Roads Committee. A new apportionment plan is contained in the bill (H. R. 4915). It allots funds on the basis of one-half for population, one-fourth for area and one-fourth for postroad mileage, whereas the earlier Robinson proposal allotted one-third on each base for federal-aid highways and secondary and feeder roads, and for roads in urban areas on the basis of population alone. The apportionment plan returns to that proposed in the original Robinson proposal (H. R. 2426) sponsored by the American Association of State Highway Officials. By the new bill the federal government provides 60 per cent. of the total matched funds the first year after the war and 50 per cent. in the second and third years. The total $1,500,000,000 appropriation is to be spread evenly over the three years. Of each year's allotment, $225,000,000 will be spent on the federal-aid highway system in or outside municipalities of 10,000 or more people, $125,000,000 on secondary and feeder roads and $150,000,000 on projects on the principal highways in urban areas on the federal system. Of each state's share 1½ per cent. is provided for surveys, plans, engineering, and economic investigations of projects. The full cost of railroad grade separations would be paid by the federal government.—(June, 1944.)

* * *

**Big Airport Recommended for Dallas** Master Plan Engineer Harland Bartholomew has recommended to the city council of Dallas, Texas, the construction of an airport to cost $1,700,000. The port would cover 600 acres on the west side of the new Zang Boulevard (U. S. 67) at its intersection with Hampton Road and Redbird Lane.—(May, 1944.)


Think of all the time and money you can save by handling your stripping operations with a tractor-drawn scraper that *digs, hauls,* and *spreads* its own loads. For example, in pits and quarries, adaptable to tractor operation, you can open up larger areas . . . get down to "pay dirt" faster with fewer men, and eliminate costly rehandling of overburden. It's good business to get complete facts now. Write for additional information to LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

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# Legal Decisions

## Blasting Litigation

The No. 1 blasting suit of all time, involving rock quarries, is now in the course of final litigation. In the first decision, rendered by the referee, the quarry company was held liable in heavy damages for alleged injuries to a dwelling situated one mile from the quarry and, also, for alleged nervous disorders of an occupant of the dwelling. This case was appealed to a lower court which refused to hold the quarry company liable for illness of the occupant of the dwelling, but upheld the allowance for damage to the house. The quarry company has appealed to the higher court and it is hoped that the final decision will relieve the company from all damage allowances. We shall in these pages report the outcome of this final decision, when rendered, but now we shall briefly outline the important facts of this litigation.

The facts are as follows: A quarry company owns and operates a stone quarry and stone crushing plant at Clinton Point in New York on the Hudson River at which it produces crushed and broken stone—materials widely used in road building, street paving and concrete structures generally and for moles and breakwaters and for public works generally. During the war the largest part of defendant's production has been used in the construction of drydocks, airfields, army camps and other Army and Navy projects. This is a highly essential and legitimate business, and, of course, not of itself a nuisance.

The quarry has been operated by the quarry company since 1919, and by its predecessors many years before. Persons named Dixon purchased their property in 1921 and went to live there with *full* knowledge of the existence and operation of the quarry. The distance between the Dixon property and the quarry at the nearest point is 6,300 feet.

The quarry's operation is conducted by boring well-drill holes vertically from the top of the ledge to the quarry floor. The holes are eight inches in diameter, are set back about 25 feet from the quarry face, and about 20 feet apart. Usually two or three, and occasionally more, are discharged at a single blast.

The testimony proved that the quarry company had kept and produced a full record of its well-drill blasts from January 1, 1929, to and including April 2, 1943, showing the date, time of day, number of holes, and the total amount of explosive used in each blast.

The Dixons proved that there have been 463 well-drill blasts since 1935, and that the blasts from 1935 were fairly uniform in the amount of explosive used, the highest being 6,945 pounds and the lowest about 1,000 pounds (fol. 2807). Before 1935 the blasts were larger. The Dixons' present house was built in 1931. The outer walls, foundations, and chimneys are of stone; the second-story exterior walls are of stucco; and there is a concrete porch and coping. There are cracks in the plaster walls and ceilings, in the concrete porch and rail, and elsewhere. Most of the cracks were in evidence in 1935, but some are more recent. Mrs. Dixon suffered a nervous disorder which she claims was caused by continuous vibrations resulting from the blasting operations.

It was admitted that before the Dixons can recover damages for injury to their home they must prove, first, that the consequential injuries sustained as the result of vibration caused by blasting was caused by negligence on the part of the quarry company; second, that the burden of proof is on the Dixons to establish by a preponderance of evidence that the injury complained of was caused by the vibration resulting from the blasting; third, that expert testimony is entitled to great weight in deciding the litigation.

About 25 years ago the problem of earth vibrations arose. There was the tendency of the human body to emphasize them; and the fact that they were caused by the use of explosives tended to confuse them in the popular mind with accidental explosions on the surface, which, of course, produce results of an entirely different character. Modern higher courts recognize that a vibration has two characteristics—amplitude and frequency. The amplitude is the distance the particle of earth moves from its original position. The frequency is the number of amplitudes per second. If the amplitude and frequency of a vibration be known, then its capacity to do harm can be measured.

A seismograph is practical for this purpose and consists of a heavy weight hanging in a frame. When the earth on which it rests is vibrated, the frame moves with the earth; but the heavy weight does not move, but remains still, and is, therefore, a fixed standard by which the motion of the frame and of the earth under it can be measured. There is another way in which the de-


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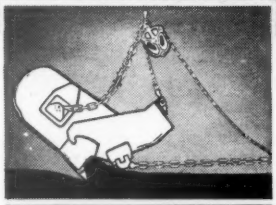

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structive capacity of a vibration can be ascertained when its amplitude and frequency are known. Acceleration is the rate of increase of speed and has a direct relation to kinetic energy. The U. S. Bureau of Mines, as a result of extensive field work, has found that vibrations of this order must have an acceleration equal to the acceleration of gravity in order to be sufficient to cause structural damage.

According to scientific tests made on the Dixons' home the vibrations produced by the blast were less than those produced by a man walking on the floor of the room. Also, many witnesses who lived in houses about the same distance from the quarry testified *not* in positive terms that blasting operations caused their plaster to crack. However, in reaching his decision that Referee made the assumption that any vibration that rattles china on a pantry shelf must be forcible enough to crack plaster and split a concrete block. In other words, without any evidence of facts, he accepted the opinions of untrained persons, and dismissed as "scientific evidence" photographs of what actually took place in his presence.

A witness, who lived about ⅛ of a mile from the site of the Dixon house and a little farther from the quarry, testified that for 40 years, during which the blasting had gone on, she noticed no noise from the blasts but had noticed them in the motion of the earth when she was outdoors. The china rattled, but none was broken. She said she did not *know* the cause of cracks in her window panes.

The court recognized the fact that there was no doubt that Mrs. Dixon is suffering from an illness either nerous or mental—a malady which all the doctors who testified agree is curable. Upon the theory that the quarry company is responsible for this condition, the Referee awarded to her damages of $2,000. However, as above mentioned, the lower court reversed this part of the decision and it is believed that, in view of the testimony, the higher court may reverse the allowance for damage to the Dixons' dwelling.

## Intrastate Business

The question whether commerce is interstate or intrastate must be determined by the essential character of the commerce, and not by mere forms of contract.

For instance, in Manlowe & Distributing Company, Inc., *v.* Public Service, 140 Pac. (2d) 287, it was disclosed that merchandise was shipped from the Philippine Islands to Seattle, put in storage, and then sold by the shipper's agent to such customers in Washington and other states as might desire to purchase it. The higher court held that distribution of the merchandise to the customers, or to the shipper's substorage depots by rail or truck constituted "intrastate commerce" subject to the laws of Washington.

Also, see Baltimore and Ohio S. W. R. Company *v.* Seattle, 260 U. S. 166, where a shipper billed his goods from one state to another, paying the interstate freight, and reshipped them to another point in the second state. This shipper interrupted the transportation only to take advantage of a difference in his favor between the through rate and the sum of the rates paid. The court held that the essential nature of the entire movement was in interstate commerce and the shipper must pay the lawful rate which was the interstate commerce rate.

## Ordinary Damages Allowed

The amount of damages recoverable from one who unlawfully takes nonmetallic materials from land depends upon the circumstances. For illustration, the measure of damages in a suit for tort, such as conversion or trespass, is greater than the measure of damages allowed upon a litigation arising out of a contractual relationship, express or implied.

However, where a land owner knows that materials are being unlawfully removed from his land he must immediately enter objections, otherwise the court will allow only nominal damages, or damages exactly equal to the value of the materials.

For instance, *Farrington v. A. Teichert & Son*, 139 Pac. (2d) 80, it was disclosed that a contracting firm was negotiating with a city for a contract to construct a conduit, and in this connection the superintendent of the firm visited the site of the proposed construction and discussed it with the city's engineers. In the course of this examination, since rock, sand and gravel were required in the proposed construction, the contractor and the city's engineers examined the gravel pits from which the city's specifications proposed that such rock, sand and gravel should be obtained. The city owned a great deal of the land in and around that


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locality, and the city's engineer advised the contractor that all of the land belonged to the city.

After the contractor had removed a considerable quantity of sand and gravel the owner of adjacent land filed suit against the contractor to recover heavy damages on the contention that the contractor had taken the materials from his land and that such act was illegal trespass. However, the contractor proved that the owner of the land had visited the site of the pit some seven or eight times, examining the pit, checking locations and noting contractor's operations and removal of rock, sand and gravel, but did not indicate or state that the gravel pit might be partially upon his land. In view of this testimony the lower court held that the taking of the material was not tortuous, but was with the land owner's consent, acquiescence, ratification, approval and confirmation; and that accordingly the latter was entitled to receive only the reasonable market value of the rock, sand and gravel removed, which the court found to be 3½ cents a cubic yard for 39,701 cubic yards, and gave judgment for $1,389.54. The higher court approved this verdict, and said:

"Mainly the trial court found that it was not true that respondent had unlawfully converted the rock, sand and gravel; that it was not true that respondent (contractor) removed the rock, sand and gravel without right, title or license; that the removal of the rock, sand and gravel was ratified, approved, confirmed and consented to, and acquiesced in by appellant; that his land owner's conduct, ratification, approval, confirmation, acquiescence and consent become entitled to and agreed to receive therefor the reasonable market value of said rock, sand and gravel in place on his said lands. . . Obviously, therefore, appellant (land owner) was not entitled to recover the full price received by respondent (contractor), but only the reasonable value of the rock, sand and gravel."

## Zoning Law Not Effective

Considerable discussion has arisen from time to time over the legal question whether a zoning city ordinance may be used to prevent property owners from taking natural resources from their land.

For illustration, in *De Felice v. East Haven,* 32 Atl. (2d) 635, it was disclosed that a person, named Felice, is owner of a twelve-acre tract of land, in a city, utilized as a commercial sand pit. The city's zoning and building inspector rejected Felice's application for a permit to install a sand classifier on this land. So De Felice appealed to the court.

During the trial testimony was given which proved that for many years the land owned by Felice had been used for extracting sand and gravel by ordinary methods. The city zoning inspector observes the construction of several concrete footings on the tract to be utilized in the installation of the wet sand classifier and he stopped the work. The inspector contended that Felice was violating a city ordinance which provided that in Zone A, in which the property is located, no industrial firm shall be established excepting for "existing uses".

Therefore, the question presented the court was whether the use of the wet sand classifier involves an extension of the nonconforming use or whether it is merely the substitution of a more modern and efficient apparatus and method for those formerly used.

In holding in favor for Felice, the higher court held that although improved and more efficient instrumentalities are utilized in the pit, this does not exclude it from the category of an "existing use".

This higher court also held that no city zoning ordinance can be employed to prevent an owner from taking earth products from his land. But, if his sand pit or quarry is in a residential district he may be prevented from treating the product in that place, providing the "treatment" is objectional to nearby property owners.

And again see *Haller Company,* 295 Pac. 257, 261. This higher court clearly stated that the fact that improved and more efficient instrumentalities are utilized does not exclude it from the category of an "existing use", provided these are ordinarily and reasonably adapted to make that use available to the owner, and the original nature and purpose of the undertaking remain unchanged.

## Tax Suit Stayed

It is well known that the Soldiers' and Sailors' Civil Relief Act, passed in 1940, was intended to protect members in military service against unwarranted suits. In fact, the purpose of the law is to relieve persons engaged in military service from the mental distress occasioned by the inability to meet financial and other obligations and commitments, because mental distress has the tendency to impair his efficiency as a member of the militia, and, as well, the tendency to impair the efficiency of the organization with which he may be associated.

For example, in *Reynolds v. Haulcroft,* 170 S. W. (2d) 678, a state filed a foreclosure suit against a sailor to gain possession of certain land on which no taxes had been paid for several years.

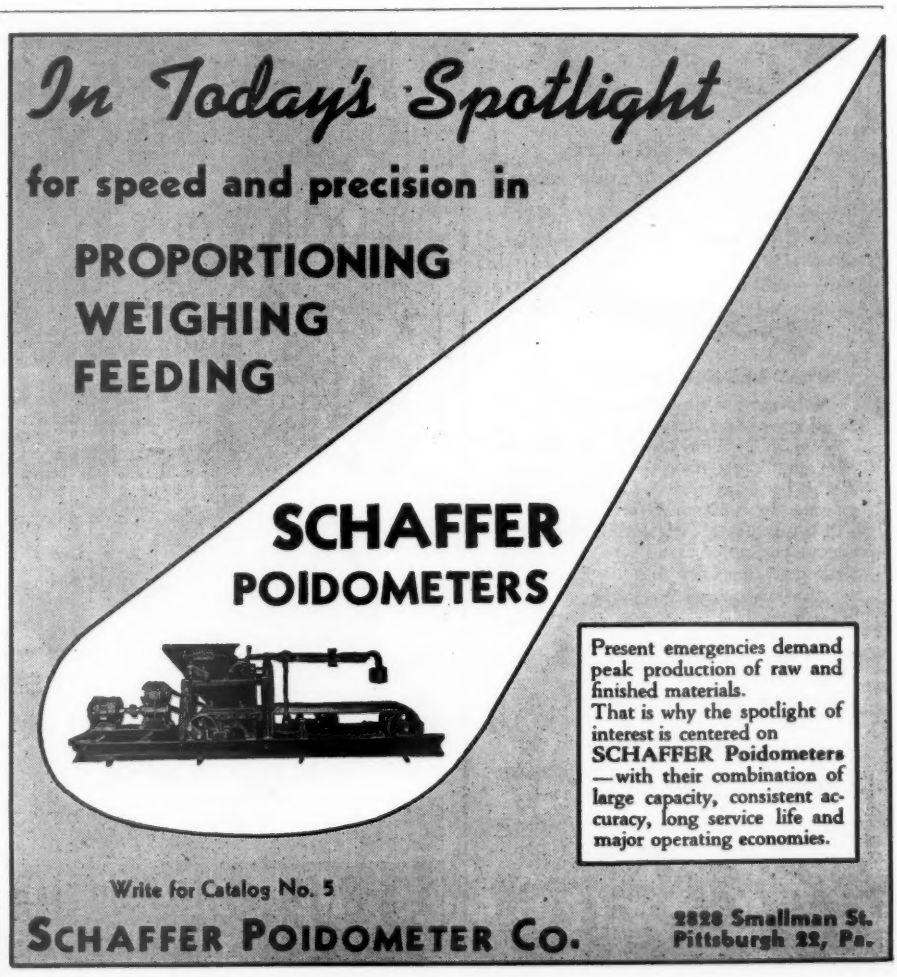
## Intentions Important

Modern higher courts consistently hold that the the actual "intentions" of contracting parties is paramount when deciding their legal obligations. Therefore, persons of sound mind who, after discussion, sign an unambiguous instrument, after it has been read to them and copies thereof placed in their hands for examination, cannot claim that they did not have knowledge of the contents of the instrument. The same law is applicable to those who fail to read a contract.

For illustration, in *Leslie v. Sherman,* 139 Pac. (2d) 133, it was shown that land owners contended that a lease for a rock quarry was void, because they did not understand the legal effect of its contents. However, the higher court held the lease valid, saying.

## Statute Inapplicable

The common law is applicable in states where no statute clearly defines the duties of employers to safeguard the health of employees. In such states the employer is bound to furnish machinery and appliances reasonably safe for the use intended. "Reasonable safety" within the meaning of the law means that the machinery and appliances furnished must be of the usual and ordinary kind adopted by those in the same kind of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business. An employer is not even bound to provide the safest machinery or the newest and most approved appliances. He has performed his duty in this respect when he furnishes those of the ordinary character in general use in the business in which he is engaged.

In states where statutes define the duties of employers, to safeguard the health of employees, the courts will abide strictly by the exact wording and formulation of such laws.

For illustration, in *Prattico v. Hudson Company,* 32 Atl. (2d) 733, a state law was litigated which provides: "Exhaust fans of sufficient power, or other sufficient devices, shall be provided for the purpose of carrying off . . . dust from emery-wheels, grindstones and other machinery creating dust." Another state law provides that ventilating currents shall . . . dilute, render harmless and sweep away smoke and noxious or dangerous gases.

Neither state law referred to "dust" which arises from ordinary causes in quarries, mines and other places of employment.

An employee who worked in a mine contracted an occupational disease of anthro-silicosis, commonly known as "miner's asthma".

The fundamental question was whether or not the employee, who admitted he knew his work "must make dust", made out a case for the jury by showing merely that he contracted silicosis after working for eight years under conditions where the air became dust-laden "intermittently".

In refusing to hold in favor of the employee, the higher court said:

"When the legislature takes a step in advance of the common law and imposes additional burdens upon an employer in order to meet the necessities of modern industrial growth, the new duties thus imposed should be so clearly set forth as to leave no doubt as to the legislative intention. There should be no such thing as a doubtful statutory duty."

## Questions and Answers

**[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers. Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—Ed.]**

*Legal Editor:* Are producers of railroad track ballast which is sold f.o.b. purchaser's cars at ballast plant but shipped into other states considered to be interstate shippers where the purchase orders, shipping instructions, and invoice payment for such ballast all originate within the same state in which the ballast is produced and loaded?—T. L. W. L. C.

*Answer:* From the standpoint of certain federal laws, as the Fair Labor Standards Act, such producers of railroad track ballast would be considered as being engaged in interstate business or commerce.

Modern higher courts uphold the validity of the Fair Labor Standards Act, which requires employers to pay specified minimum wages, and time and one-half for overtime, to employees engaged in "processing, manufacturing or handling" goods in interstate commerce. For example, in one case *Brooks,* 137 Pac. (2d) 918, a company in Kansas sold merchandise to another company in Kansas which processed it and made interstate shipments. The higher court held that both companies were subject to the Fair Labor Standards Act. Also,


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in *Warren,* 63 S. C. R. 125, the Supreme Court of the United States held a company to be engaged in interstate commerce transactions where it performed work in one state which produced merchandise which ultimately was shipped outside the state by purchasers.

Also, see *Orange Company v. Tuggle,* 27 S. E. (2d) 769, where an employee was employed to assist in unloading trucks at the employer's plant. The trucks contained merchandise transported from other states. The higher court held in favor of the employee, and said:

"The unloading at destination of an interstate shipment is work in interstate transportation, whether done by the carrier or another."

On the other hand, in *Couch,* 168 S. W. (2d) 822, the higher court refused to hold that a company was engaged in interstate commerce where less than one percent. of the ice it manufactured was sold to railroad companies to ice cars used in transporting merchandise interstate.

All higher courts hold that any and all transactions are interstate which are one or more links in deals or acts ultimately intended to perfect a shipment of merchandise from one state into another state.

* * *

*Legal Editor:* Please inform me whether or not there is legal liability if an inventor continues, after the patent has expired, to mark his invention "Patented," with the date the patent was issued.—S. D. C.

*Answer:* There is no legal liability, if after a patent has expired, a patentee continues to mark his manufactured articles "Patented," followed by the date on which the patent was issued, as observers are thus informed truthfully and may readily determine that the patent is ineffective.

There is record of a litigation involving the use of the mark "Patent Applied For," in which it was disclosed that an inventor thus marked his invention for which no application for a patent had been filed. In this case legal proceedings were instituted against the user on the grounds of fraud and misrepresentation, and the court held that the marking of the invention in this manner, under these circumstances, actually constituted an offense.

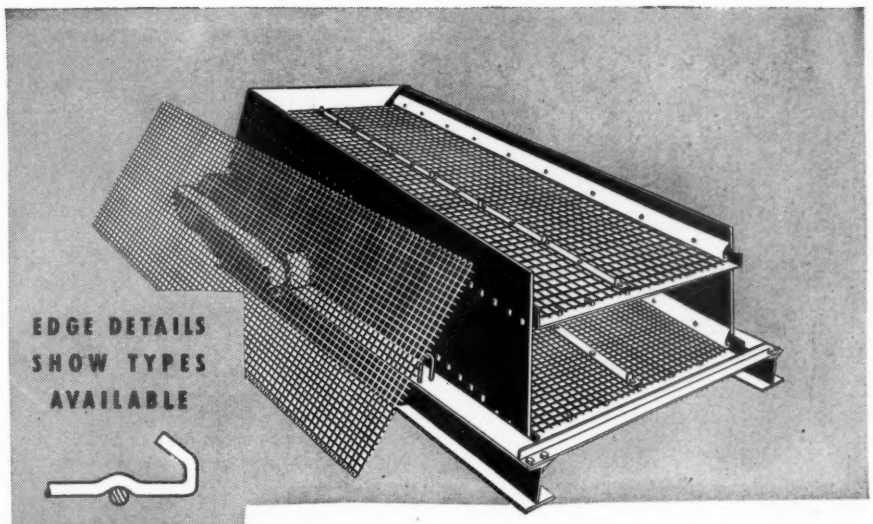
The penalty for falsely marking articles "Patented" is a fine of $100 for each offense, with other stipulations; but the law does not prescribe a penalty for the use or misuse of the terms "Patent Applied For" or "Patent Pending." These terms have been adopted by inventors without legal authority, although the proper use of them is considered by higher courts as lawful.

* * *

*Legal Editor:* Is a verbal lease on real estate and the buildings on it valid? —F. G. K.

*Answer:* According to modern higher courts a verbal lease for one year *or less* is valid. Long-term leases must be in writing. In the case of *Wewerka v. Lantron Company,* 174 S. W. (2d) 630, reported December, 1943, a company sued a property owner for damages because the latter refused to fulfill the terms of a verbal contract to lease the property to the company for five years at a stated rental. In holding the company not entitled to a recovery the higher court said:

"An oral contract which by its terms is not to be performed within a year, is within the statute of frauds."

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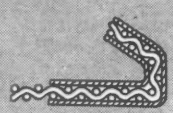
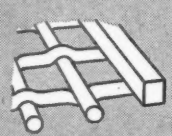


Type 3: DoubleMetal Reinforced Edge.



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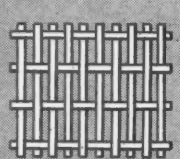

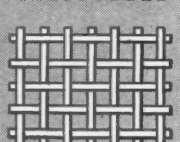

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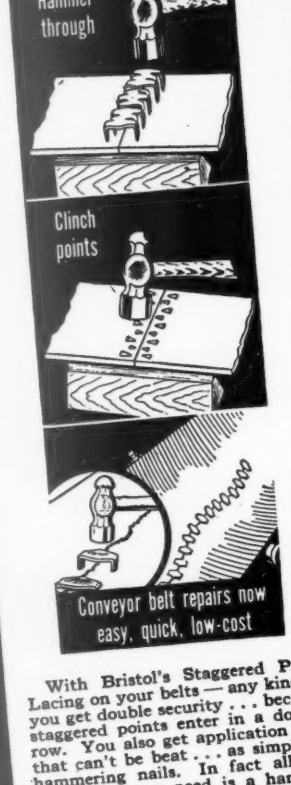


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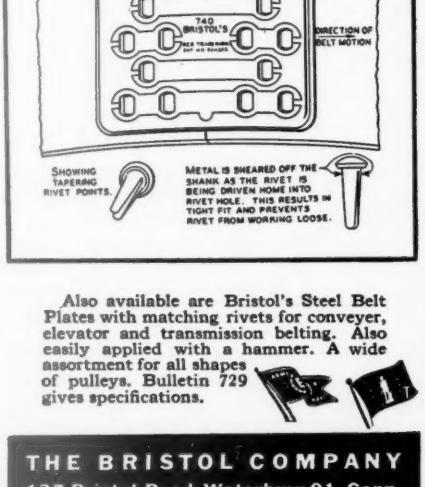
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# TRAFFIC News Digest

### Central Freight Association

*Docket 76014 (2).*—Sand as described in Exhibit A. Establish on, from the so-called Juniata Group, and so-called Paines Group to Silver Creek, N. Y., and Corry, Pa., rates as shown in Exhibit A.

*Docket 76021 (2).*—Cement, common, hydraulic, natural or Portland, carloads, minimum weight in bulk 100,00 pounds; in bulk in containers on container cars 110,000 pounds. Establish on, from Cleveland to Colona and Conway, Pa., 8 cents; from Buffalo to Colona and Conway, Pa., 10 cents, to apply only as a proportional rate on traffic destined beyond by water to points on the Ohio River and its tributaries based 66.67 per cent. of the present applicable local rate. Route: To Colona, Pa., via N. Y. C. (W); Youngstown, Ohio, P. & L. E. To Conway, Pa., *via* P. R. R. direct.

*Docket 76023 (2).*—Sand as described in Exhibit B. Establish on, from Gary-Michigan City, Ind., Group, to Pursglove, W. Va., Ernest and McIntyre, Pa., rates as shown in exhibit B.

*Docket 76024 (1).*—Sand (bank, river, or torpedo) and gravel, carloads. Establish on, from Standard Pit, Ind.. to Wheatland, Ind., 116 cents; to Montgomery and Loogootee, Ind., 121 cents per net ton.

*Docket 76026 (2).*—Slag, having value only for extraction of metal, in bulk in open-top cars, carloads, minimum weight 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply. Establish on, from Chicago to Philadelphia and Port Richmond, Pa., 28 cents.

*Docket 76040 (2).*—Agricultural limestone, carloads. Establish on, from Woodville and Gibsonburg, Ohio, to points in Michigan on the P. M. Ry., rates as shown in Exhibit C.

*Docket 76047 (2).*—Crushed stone, in bulk, in open-top cars, carloads, minimum weight 90 per cent. of the marked capacity of the car except that when the car is loaded to its full visible or cubical capacity, the actual weight will apply. Establish on, from Spore, Ohio, to Shelby and Crestline, Ohio, 66 cents, *via* N. Y. C. (W)—Martel, O.—N. Y. C. (C), to expire 60 days after effective date.

*Docket 76054 (2).*—Limestone, ground or pulverized, carloads, minimum weight 60,000 pounds. Establish on, from Kaylor, Pa., to points in Pennsylvania, rates as shown in Exhibit A.

*Docket 76063 (2).*—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica) and gravel, in open-top cars, carloads, minium weight 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply. Establish on, from Riverton, Ind., to Washington, Ind., $1.21 per net ton.

*Docket 76068 (2).*—Lime, common, hydrated, quick or slaked, carloads. Es-


**POST WAR CONSTRUCTION CAN BE DESIGNED NOW**

*Types of Projects Solicited*

**SILOS**—"Sliding Form" Method
**STORAGE**—for all Granular materials
**BUILDINGS OF ALL TYPES**—
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**Retaining Walls** **Pumping Stations**
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**YOU CAN PROFIT BY OUR TWENTY-FIVE YEARS EXPERIENCE**

*Our engineers and construction crews are available for quick construction*

**E. C. MACHIN COMPANY**
**BUILDERS**
Commonwealth Building—Allentown, Pa.

tablish on, from Port Huron, Mich., in Charleston, W. Va., 20 cents minimum weight 30,000 pounds and 17 cents minimum weight 50,000 pounds, subject to Ex Parte 148 increase (suspended).

*Docket 76083 (1).*—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding, ground, loam, molding, molding-bounded (naturally or otherwise), polishing, pulverized or silica) or gravel, in open-top cars, carloads, minimum weight 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply. Establish on, from Elkhart, Ind., to Schneider, Lake Villege, Ind., $1.10, Enos and Morocco, Ind., $1.18 per net ton, *via* N. Y. C. (W) direct.

*Docket 76092 (2).*—Limestone, ground or pulverized, unburned, carloads, minimum weight 60,000 pounds. Establish on, from Prairie Du Rocher, Ill., and ValMeyer, Ill., to points in Indiana, Ohio and West Virginia, rates as shown in Exhibit C.

*Docket 76094 (2).*—Stone, crushed, in bulk in open-top cars, carloads. Establish on, from Woodville, Ohio, to Quincy, Mich., 118 cents; Coldwater, Mich., 127 cents; Burr Oak., Mich., 129 cents per net ton, *via* P. R. R.—Toledo, Ohio—N. Y. C. (W).

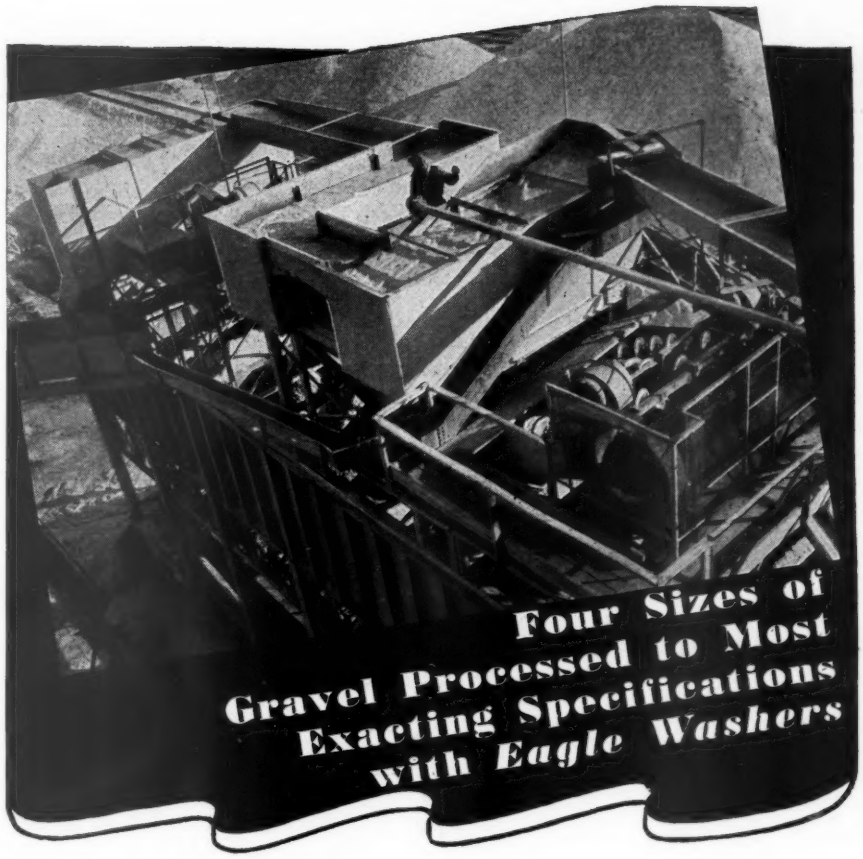
*Docket 76095 (2).*—Sand, in open or closed cars, subject to the same commodity description and carloads, minimum weight as now applicable in connection with rates in effect from the so-called Vassar Group as published in N. Y. C. R. R. Tariff 1908 and P. M. Ry. Tariff 5694. Establish on, from so-called Vassar Group, viz.: Banksand, Millington, Watrousville, Juniata and McHale, Mich.

| | Proposed Rates (cents per net ton) | |
|---|---|---|
| To: | Closed Cars | Open Cars |
| Bellefontaine, Ohio... | 220 | 204 |
| Elyria, Ohio ..... | 209 | 187 |
| Mt. Vernon, Ohio.... | 242 | 237 |
| Piqua, Ohio ..... | 231 | 220 |
| Tiffin, Ohio ..... | 198 | 160 |
| Troy, Ohio ..... | 231 | 220 |

*Docket 76184 (2).*—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and gravel, carloads, in open-top equipment, minimum weight 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply. Establish on, from Wolcottville, Ind., to Tecumseh, Mich., 116 cents per net ton, *via* Wab. R. R., Adrian, Mich., and D. T. & I. R. R.

*Docket 76181 (2).*—Lime, common, hydrated, quick or slaked, carloads. Establish on, from Hannibal, Mo., Quincy, Marblehead, Ill., to Paw Paw, Mich., 20 cents, minimum weight 30,000 pounds; 16 cents, minimum weight 50,000 pounds, *via* Wab. R. R. to Chicago, Ill., thence P. M. Ry.

*Docket 76189 (1).*—Slag, crude, etc. Cancel rate presently published on slag, crude; slag, crushed; slag, crushed commercial; or slag (a product of iron and steel blast or open-hearth furnaces) as named in following items of N. & W. Ry. Tariff GF No. 39-F; Item 2215, Sup. 37, applying from Ironton, Ohio, to New Lexington, Item 2220, applying from Ironton, Ohio, to Canaanville, Guysville, Little Hocking and Stewart, Ohio; Item 2230, applying from New Boston, Ohio,


**The President of a leading Iowa gravel company writes: "Some twenty years ago we purchased our first Eagle Washer and have used them continuously since that time. At present we have a battery of four Eagle Washers in operation. *In cost of operation and efficiency in removing objectionable material from the gravel, they have proved very satisfactory.* In our present operation we process four different sizes of gravel and all of them will meet the most exacting specifications, thus testifying again to the efficiency of the Eagle Washer."**

**EAGLE IRON WORKS**
**133 Holcomb Avenue**
**DES MOINES, IOWA**

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**Eagle Dehydrators provide 50% more dehydration than conventional sand drags—and have a greatly reduced operating and maintenance cost. Dehydrating sand up to 100 mesh, moisture reduction to 9 or 10% is readily possible. Let us give you complete details on sizes and capacities.**

**EAGLE** ***Specialized Sand and Gravel Equipment***
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS
**EAGLE IRON WORKS**
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

to Ironton, Ohio; Item 2260, applying from Portsmouth, Ohio, to Ironton, Ohio; Items 2270 to 2400 inclusive, applying from Ironton, Ohio, to N. & W. Ry. Stations, Ceredo, W. Va., to Cincinnati inclusive; Items 2410 to 2830 inclusive, applying from Ironton, Ohio, to destinations in Kentucky and West Virginia located in C. F. A. territory. Also cancel rates presently published on slag (a product of iron and steel blast or open-hearth furnaces), from Ironton, Ohio, as named in Items 2600 to 2725, inclusive, as amended, of N. & W. Ry. Tariff GF 7-D.

*Docket 76206 (1).*—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silicia) and gravel, carloads, in open-top cars. Establish on, from Indianapolis, Ind., to Rochdale, Ind., 55 cents per net ton, to expire with December 20, 1944. Route: *Via* B. & O. R. R. direct.

### Illinois Freight Association

*Docket I. R. C. 511-114-A.*—Sand, carloads, from Arenzville, Ill., to Butler, Ill. Proposed: Reestablish rate of $1.08 per net ton on sand, carloads, from Arenzville, Ill., to Butler, Ill., to expire October 27, 1944.

*Docket I. R. C. 511-179.*—Sand and gravel, carloads, to Harvard, Ill.

| | Rates Per Net Ton | |
|---|---|---|
| From: | Present | Proposed |
| Crystal Lake, Ill.... | 65 | 40 |
| South Beloit, Ill..... | 66 | 40 |

To expire with September 30, 1944.

### New England Freight Association Docket

*Docket 62694 (2-R).*—Sand, gravel and crushed stone, minimum weight of the marked capacity of the car, except that when the cars are loaded to their cubical or visible capacity, the actual weight will apply. Libby's Pit (Leeds Jct.), Me., to Bath, Me. Present 77 cents per net ton; proposed 66 cents per net ton.

### Southern Freight Association

*Docket 31697* (carrier.) — Establish rates on cement, carloads, to Panama City, Fla., for export from Chattanooga, Tenn., Cowan, Tenn., Nashville, Tenn., Portland, Ga., Ragland, Ala., Richard City, Tenn., Rockmart, Ga., Spocari, Ala., Boulevard, Fla., Ewing, Fla., Port Tampa, Fla., Port Tampa City, Fla., and Tampa, Fla., the same as to Pensacola, Fla., as published in S. F. T. B. Tariff 705-F.

### Southwestern Freight Bureau Docket

*Docket 33892 (2).*—Cement, Northampton, York and Navarro, Pa., to points in the Southwest. To establish rates on cement, viz.: hydraulic, masonry, mortar, natural or Portland, in straight or mixed carloads, minimum weight 50,000 pounds, except that when the marked capacity of the car is less, the actual weight but not less than 40,000 pounds will apply, to destinations to be furnished by shippers on the basis of I. C. C. Docket 16,845 Scales and Formula, adding 1 cent for each 40 miles beyond 1,220 miles and applying to the result an increase of 10 per cent. to determine the proper extension of these rates. Subject to Tariff X-148 (suspended).

*Docket 34088 (2).*—Limestone, shale or clay, Arkansas points, to Memphis, Tenn. To establish a rate of 80 cents per net ton on limestone, shale or clay suitable for manufacturing of cement from Batesville, Biltmore, Cushman and Croker, Ark., to Memphis, Tenn., subject to Tariff X-148 (suspended).

### Trunk Line Association

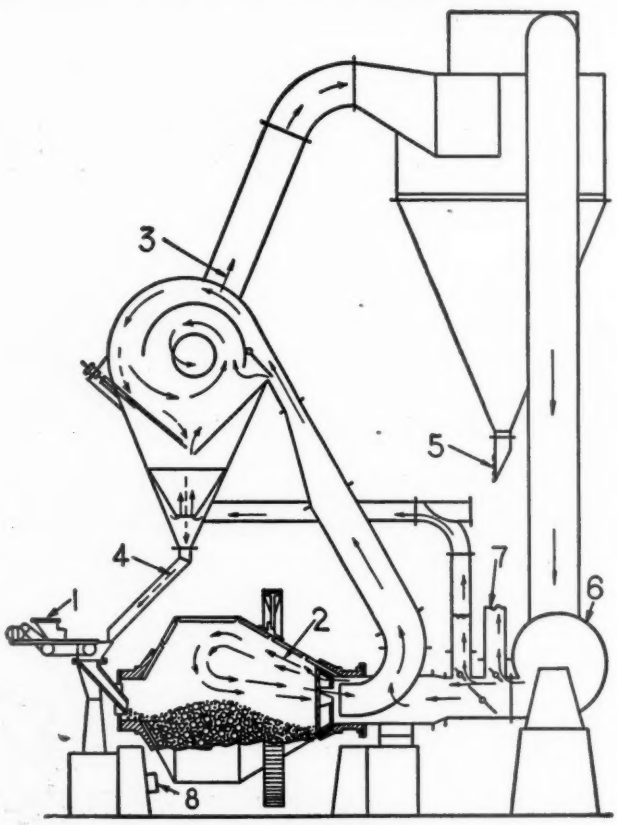
*Docket 42320* (shippers). — Stone, viz.: crushed and screenings (will not include agricultural limestone or ground limestone, unburned; fluxing stone or firestone; or stone coated with oil, tar or asphaltum), in straight or mixed carloads, minimum weight 90 per cent. of the marked capacity of the car, etc., from Monocacy, Pa., to Ashland, Ohio, $4.73 per net ton, in lieu of present 6th class rate of 34 cents per 100 pounds. Reason: To restore rates formerly in effect.

### Western Trunk Line Association

*Docket E-41-630.*—Limestone, crushed or ground, carloads, from Mosher, Ste. Genevieve and Marlo, Mo., to stations in Iowa except stations on the Mississippi River. Proposed to establish rates based on the Nebraska-to-Iowa distance scale as published in Item 9,520, W. T. L. Tariff No. 18-Q applied to the short-line distance computed *via* shortworkable routes not to exceed two lines, except where three lines are required to make a complete route. The distance from Ste. Genevieve, Mo., to be applied from Mosher and Marlo, Mo.

*Docket E-41-633.* — Sand, carloads, minimum weight, 90 per cent. of the marked capacity of the car, except that, when the actual weight of the shipment loaded to the full visible capacity of the car is less than 90 per cent. of the marked capacity of the car, the actual weight shall be the minimum weight. In no case shall the minimum weight be less than 40,000 pounds, from Browntown, Wis., to Charles City, Ia. Proposed 9½ cents per 100 pounds. (By shipper.)


**FINE GRINDING WITH CONICAL MILL AND AIR CLASSIFIER**




(1) Material fed to mill by Constant Weight Feeder.
(2) Finished material removed from mill as soon as produced.
(3) Separation as fine as 99.9% minus 325 mesh.
(4) Oversize returned to feed end of mill.
(5) Product discharged at any elevation—no elevator required.
(6) Fan returns clean air to mill.
(7) Small amount of air and vapor vented.
(8) "Electric Ear" Sound Control unit maintains maximum capacity.

**HARDINGE**

COMPANY INCORPORATED, YORK, PENNA.
NEW YORK CHICAGO SAN FRANCISCO TORONTO

# NEW MACHINERY and SUPPLIES

## ● Earth Movers

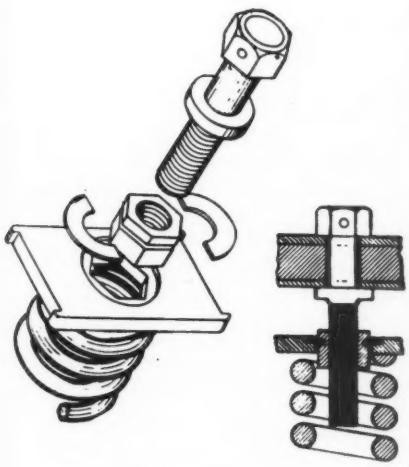
Extensive and important additions to its line of products have been announced by Caterpillar Tractor Company, Peoria, Illinois, to become effective at such future times as military requirements make possible.

Additions to the Caterpillar line will consist of a wide range of sizes and types of earth-moving machines — bulldozers, scrapers, rippers and cable control units —matched both to the current sizes of Caterpillar track-type tractors and to the present and future sizes of rubber-tired wheel-type prime movers.

## ● Shear Plates

Recently devised emergency shear plates, quickly replaceable, are a safety improvement against roll breakage on aggregate crushers made by the Iowa Manufacturing Company, Cedar Rapids, Iowa.

Under ideal working conditions, heavy helical springs of chrome vanadium steel maintain proper tension on the floating roll and keep the opening for material constant; yet when uncrushable foreign material is introduced the springs protect the roll by relieving the undue stress and prevent breakage.



Shear plates.

If exceptionally large uncrushable material passes into the rolls shear plates at the butt of the spring snap and free the springs completely. Each shear plate consists of 11-gauge sheet iron, and is located in the slot of the adjustable plate that holds the spring in position as shown in the drawing.

Any large piece of uncrushable material, such as tramp iron, would cause the nut, slotted for and holding the shear plate, on the end of the adjustable screw bolt, to shear the plate and allow the unrestrained bolt to pass through the spring and instantly release all tension on the floating roll.

To resume operation it is only necessary to replace the shear plates. Extra plates are furnished with each crusher.

## ● Hose Clamp

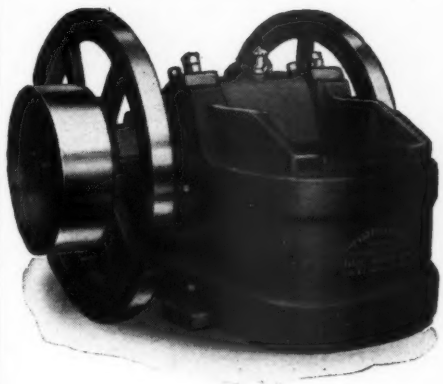
The new Punch-Lok hose clamp, available from ¾ to 48 inches in diameter is a mechanical device for connecting various kinds of male and female fittings, special nipples, menders or ordinary pipe to hose. All hose from the modern high pressure wire woven and braided hose used in the control of hydraulic machines such as coal excavators, road scrapers and snow plows, acetylene and pneumatic-tool hose, electric welding cable, sand blast hose, or any kind of flexible coupling between rigid pipe lines or fittings for air, steam, bituminous materials, gasoline and oil, down to ordinary air and water hose may be fitted with this streamlined clamp.

Punch-Lok hose clamps and fittings have been engineered to make application possible without injury to the hose itself, and the manufacturer states that, once the clamp has been locked, neither vibration nor rough handling can loosen it. In making the connection, a broad flat high-tensile-strength galvanized-steel band is double-wrapped around the joint. After tensioning with a pull of 1,000 pounds within the locking tool, the ends are securely locked together under tension without loss of tension within the flat pressed-steel clip, and the excess band cut off flush with the clip so that the entire joint is streamlined for safety.

The Punch-Lok method of banding, clamping and splicing is now being used


FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.



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FOR CRUSHED STONE, SAND, GRAVEL AND OTHER ABRASIVES

This new folder No. 601-BE on "Buff-Aloy" Wire Cloth mailed promptly on request tells you about:

- Greater resistance to abrasion
- Many extra hours of service
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- Greater resistance to fatigue
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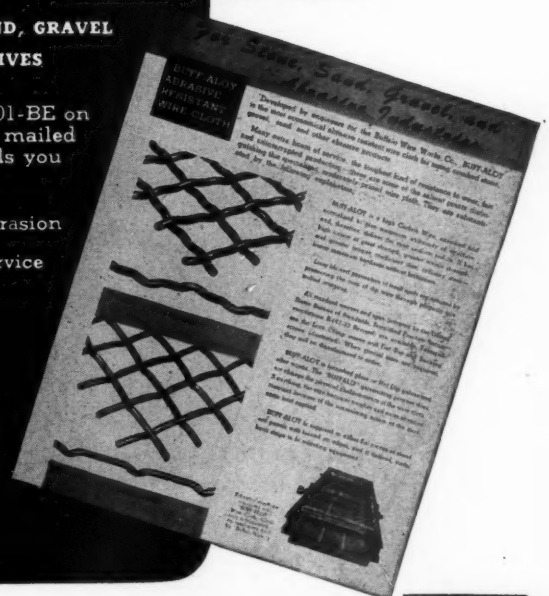

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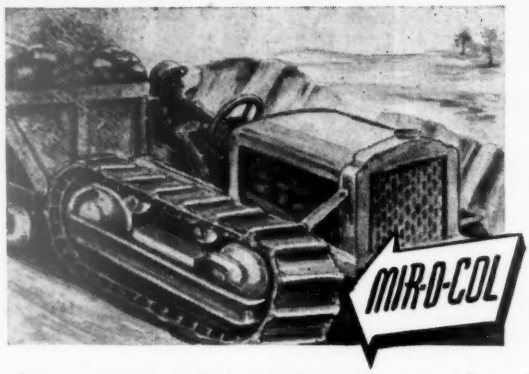


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Grousers, sprockets, end connectors, idler wheels, track rails, engine valves and all parts subject to extreme conditions of wear should be HARD FACED to insure the maximum hours of trouble-free operation.

Let **MIR-O-COL Hard Facing Rods** — low in cost but high in wear resistance — assist you in solving your maintenance problems.

Send for your Free copy of the **WELDOR'S GUIDE** to Successful **HARD FACING** Technique

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Inquiries invited from interested distributor organizations.

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**2416-30 EAST 53rd STREET**
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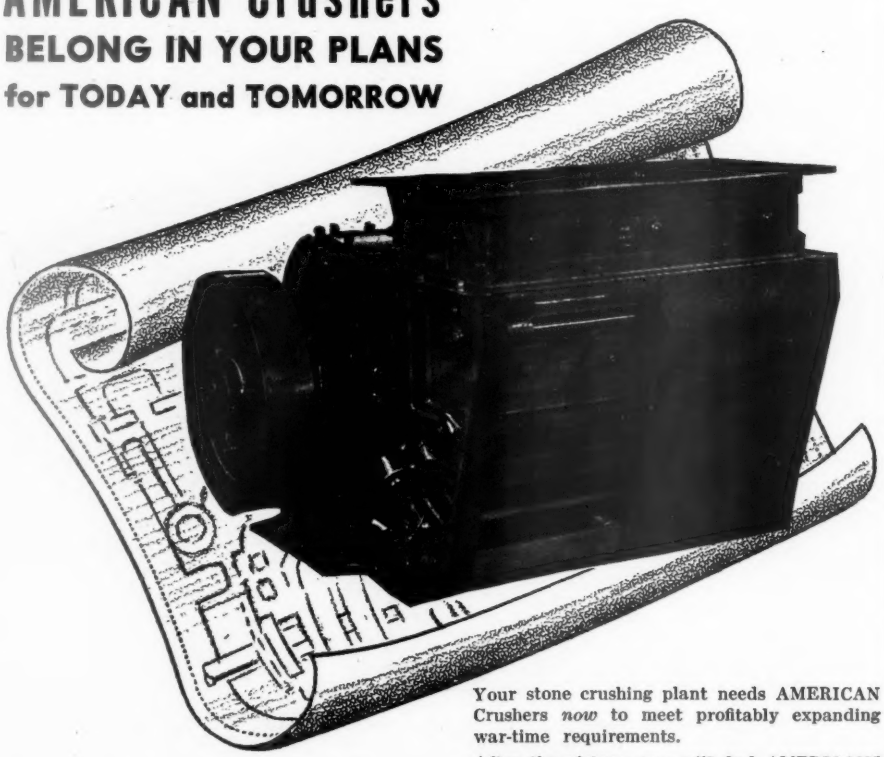
**AMERICAN Crushers**
**BELONG IN YOUR PLANS**
**for TODAY and TOMORROW**



Your stone crushing plant needs AMERICAN Crushers *now* to meet profitably expanding war-time requirements.

After the victory, you will find AMERICANS just as indispensable for supplying industrial demands on a competitive basis.

*Write for Bulletin*

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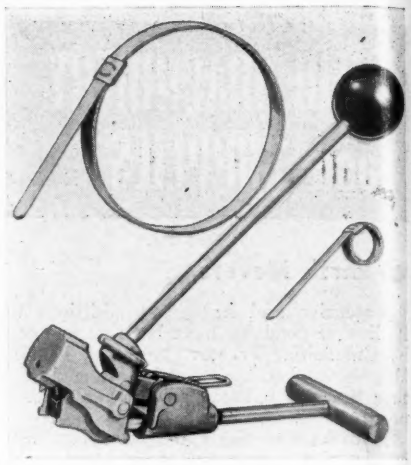


Hose clamps and tool.

in hundreds of production and maintenance jobs in all industries— not only for connecting high pressure hose—but also for splicing electric welding cable; stopping leaks in steam and water lines; reinforcing and mending splits in crossarms and ladder rails; tieing rigid conduit or flexible cable to existing pipelines or girders; seizing ends of wire or manila rope to prevent fraying—and countless other jobs.

For electrical applications, such as line taps and ground clamps or for splicing flexible welding cable, where corrosion resistance is essential, Punch-Lok clamps may be obtained in Everdur a copper-base alloy. Clamps available in performed or open-end type, the latter for lacing around the object where end obstructions would prevent use of performed clamp. For prices and descriptive catalog write Punch-Lok Company, Chicago.

## ● Motors

A new line of large, heavy-duty induction motors is announced by Electric Machinery Manufacturing Company, Minneapolis, for all types of industrial, power plant, water works and other drives. Motor sizes range from 200 to 1000 horsepower, and are available in squirrel-cage and wound-motor models. Special electrical and mechanical modifications can be supplied to meet specific power service and motor application conditions.

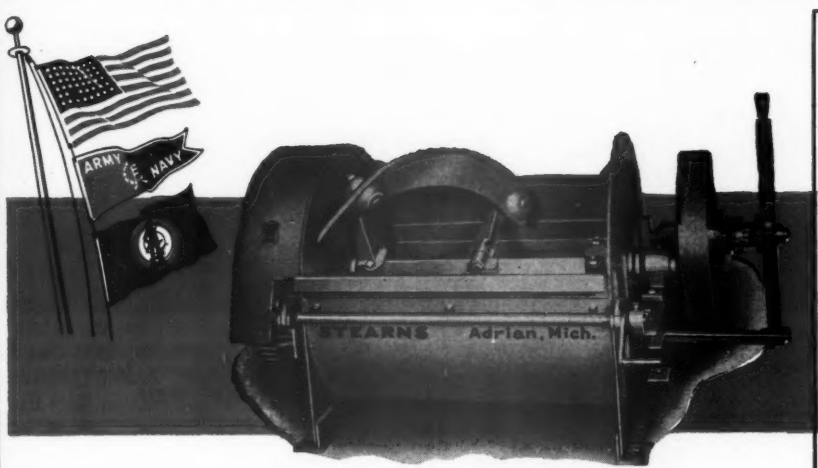
The heavy, reinforced motor frame construction is of fabricated steel plates, or close-grained cast iron depending on the size and type of motor. Form-wound stator coils have multi-layer insulation with high dielectric strength and moisture resistance, and is somewhat pliable to withstand the strains of heavy service. High thermal capacity, frazed cage winding—practically indestructible—on squirrel cage motors. Well insulated, strongly braced rotor winding on wound-rotor motors.

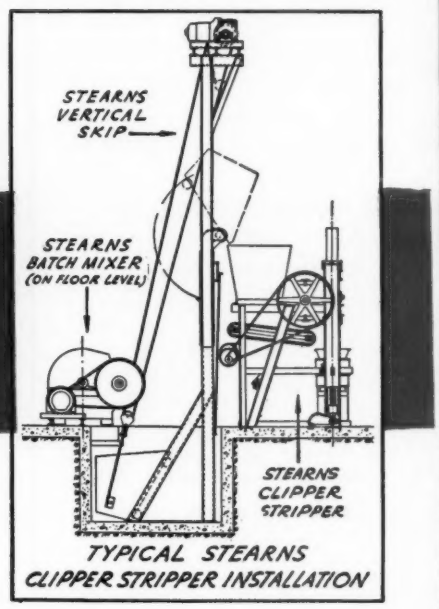
Directed, smooth-flow ventilation for cool motor operation is provided by rotor fan and conical baffling. Large motor shaft is accurately machined and finished. Modern, one-to-one ratio sleeve bearings are standard. Ball or roller bearings can be supplied. Protective inclosure for drip, splash, or other special conditions, and enclosed construction for direct ventilation, can be furnished. Ask for Publication 169.

AUGUST, 1944

The CONCRETE MANUFACTURER

A Special Section of...




TYPICAL STEARNS CLIPPER STRIPPER INSTALLATION

# More Blocks—Less Man-Power — *that's* the Problem!

● **Making more and better blocks at lower costs** is a problem Stearns Equipment has successfully solved in hundreds of concrete product plants. For instance the—

● **Stearns Mixer** with its lowest charging height, conveniently located door control and handy bag shelf **reduces manpower to a minimum.** Into each machine is built wear-resisting, quickly shifted, removable liner bars . . . Drums are of steel plate welded to heavy heads . . . Mixing blades of "Sterloy" . . . Bearings: self aligning, anti-friction. Supplied in 12, 18, 28, 42 and 50 cu. ft. capacities with pulley, V-belt or Gear-head motor drive.

● **Stearns Skip Loaders** also cut man-power costs of elevating mixed concrete into feeding hoppers and charging dry materials into elevated hoppers. **Push button control** stops bucket in any position . . . Stops automatically when dumped. Easily installed as a separate unit and may be used with any type of mixer. Independent motor or mixer drive types. Proper track and cable lengths permit wide application.

## *Performance* Speaks Louder than Words

● **Tell us** the type of products plant machinery you need and we'll gladly refer you to Stearns-equipped plants located within convenient visiting distance.

● **Descriptive Literature** covering Stearns Mixers, Skip Loaders, Vibration and Tamp Type block and brick machines will be mailed upon request.

**STEARNS**

GENE OLSEN, PRESIDENT

*Designers and manufacturers of vibration and tamp type block and brick machines . . . Mixers . . . Skip Loaders.*
*Licensed under the basic Gelbman Vibration Patents.*

# The CONCRETE MANUFACTURER

AUGUST, 1944

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION AND USES OF CONCRETE PRODUCTS AND READY - MIXED CONCRETE

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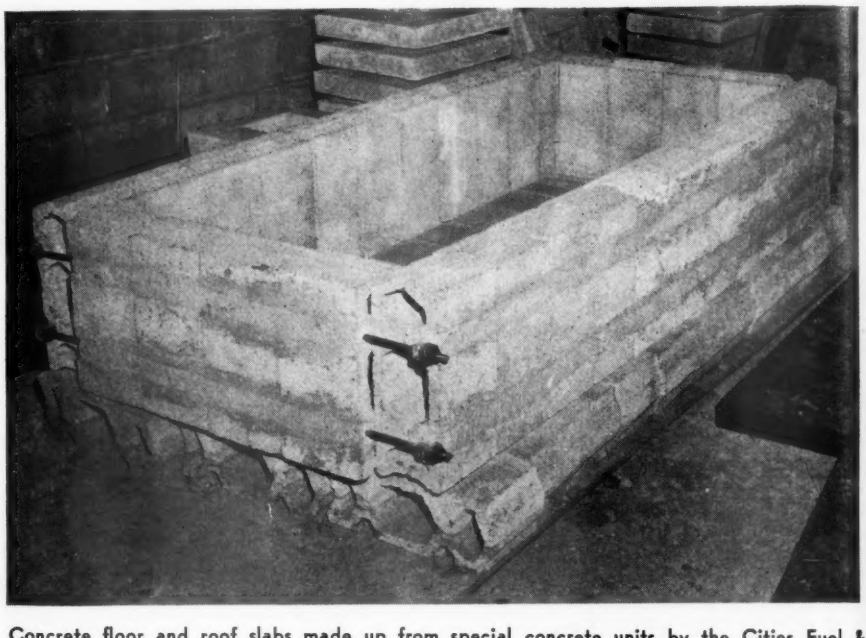


Concrete floor and roof slabs made up from special concrete units by the Cities Fuel & Supply Company, Milwaukee, are also being used experimentally in the fabrication of milk-cooling tanks. One of these tanks is pictured above.

## Acquire Concrete-Pipe Plant at Riverside

Harvey Adair of El Monte and S. L. Babcock of Riverside have purchased the Riverside, California concrete-pipe plant of Gus Almquist and will place it into operation on sub-packed irrigation pipe at once.

The firm will be known as the A. & B. Concrete Works. The plant enjoyed a substantial business in irrigating pipe for several years under the guidance of Gus Almquist, who was compelled to give up the business because of ill health.

## Pumps Handle Concrete for Lewistown Pipe

Installation of concrete pumps instead of using hand-shoveling methods of feeding concrete into rapidly rotating forms for the manufacture of pre-stressed pipe in sizes from 12 to 60 inches, has been highly advantageous for the Lewiston Pipe Company of Chicago.

The substitution of Pumpcrete machines for this work has resulted in a 50-per cent. labor saving and has doubled the output of the plant as operated by hand-placing methods. In other words, one-half as many men can turn out twice the previous daily volume of pipe. The pipe, designed for internal pressures up to 200 lbs. per square inch, is made by first casting a concrete shell, in which longitudinal stress rods are incorporated by the centrifugal process. After a period of steam curing, the shell is rotated in a special winding machine which wraps its outer surface spirally with high strength steel wire, applied under tension. In a third and final operation a 1-inch protective coating of mortar is molded over the wire-bound shell.

## New Plant Will Make Concrete-Silo Staves

The Mason & Lawrence Silo Company of Elgin, Illinois, is erecting a plant at Cissna Park, Illinois, for the production of concrete silo staves. Ground for the new plant was leased from the C. & E. I. Railroad.

William Reed, son-in-law of S. J. Hoffman, who heads the company, will be in charge of the plant.

A body identified as that of Joseph Gentil, 43, river pilot for the Union Sand & Gravel Company of Cincinnati, was found in the Ohio river near Yankeetown, Indiana, recently.

# Stresses Pre-Shrunk Advantages of High-Pressure-Steam Curing

ONE of the most ardent advocates of high-pressure-steam-cured cinder blocks is M. W. Ferguson, president and general manager of Cinder Block, Inc., of Roanoke, Virginia, who has been making them since 1940 in one of the largest and best equipped block plants in this country. Few other operators combine the long experience in cinder block manufacture, the plant, and the complete system of quality control which give authority to everything Mr. Ferguson has to say on this subject.

The original Stone Tile & Supply Company was formed in 1927 to make stone tile. In 1931, at the beginning of the depression, Mr. Ferguson started the manufacture of cinder blocks with steam-curing at atmospheric pressure. The output was gradually expanded to meet the increasing demand for this product and reached the respectable volume of 800,000 blocks in 1936. All went well until some of the cinder blocks were used for exterior exposed work. When these blocks began to crack and spall due to shrinkage it became evident that something drastic had to be done to keep this business. This necessity was accentuated by the fact that the war-construction boom was beginning to make itself felt and the rapidly-growing demand for blocks put a premium on anything which would speed up output and shipments.

This problem was solved by the installation in 1940 of eight Jackson & Church high-pressure steam autoclaves or curing kilns using 360-degree steam at about 140-pound pressure. This method of curing enabled the company to produce fully-cured, pre-shrunk blocks which do not crack even under the most unfavorable conditions.

With these kilns and the two Stearns Joltcrete vibrating block machines which had replaced the former tampers the company was able to supply a large percentage of the blocks used for vital war construction throughout the state of Virginia, particularly in the Norfolk shipbuilding area which is more than 250 miles from Roanoke. In 1940 a total of 1,572,000 standard 8 by 8 by 16-inch-equivalent cinder blocks were produced. This increased to 2,300,000 in 1941, 2,850,000 in 1942 and 3,458,000 in 1943. According to Mr. Ferguson the all-time high output for 1943 would have been equalled and perhaps exceeded in 1944 except for the acute labor shortage which has reduced the number of employees from the record number of 206 in March, 1943, to 80 in April, 1944. Of the later figure 17 are in the office or in administrative capacities. During 1943 the plant was operated 16 hours daily 6 days a week but this is no longer possible.

The use of high-pressure-steam curing has actually made it possible to ship blocks which exceed all specification requirements within 24 hours after they are made. Actually more than 60 per cent. of the 1943 output was shipped within 24 hours and some of it was actually laid on the job within that period. These blocks are stronger at 1 day than the old blocks were after 28 days.

Display board in office showing a view of the plant and list of jobs which have been supplied with the company's units.

Metal sign, greatly reduced in size, used on jobs served by the company.

High-pressure-steam curing made this emergency production record possible, according to Mr. Ferguson, but its advantages during periods of normal peace-time demand are also important. He says that with ordinary curing methods, even in normal times, when 65 sizes and types of blocks were made and these had to be stored for 28 days before shipment, it was impossible to insure the delivery of fully-cured blocks even with the available ground storage space for 2,000,000 blocks. As a result many of the blocks shipped failed to meet all specifications.

As verification for his statements Mr. Ferguson referred to a chart showing the relative shrinkage of ordinary cinder blocks and modern, high-pressure-steam-cured blocks. This chart was the result of tests on 150 blocks of each type which were identical in every way except for the curing. It shows that an ordinary cinder block, in drying out from a saturated state to a 10-per cent.

(*Continued on page* 86)

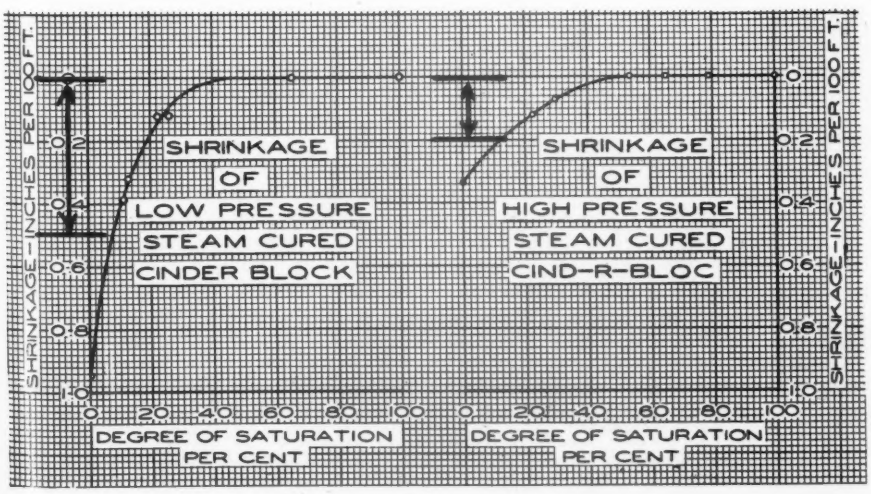
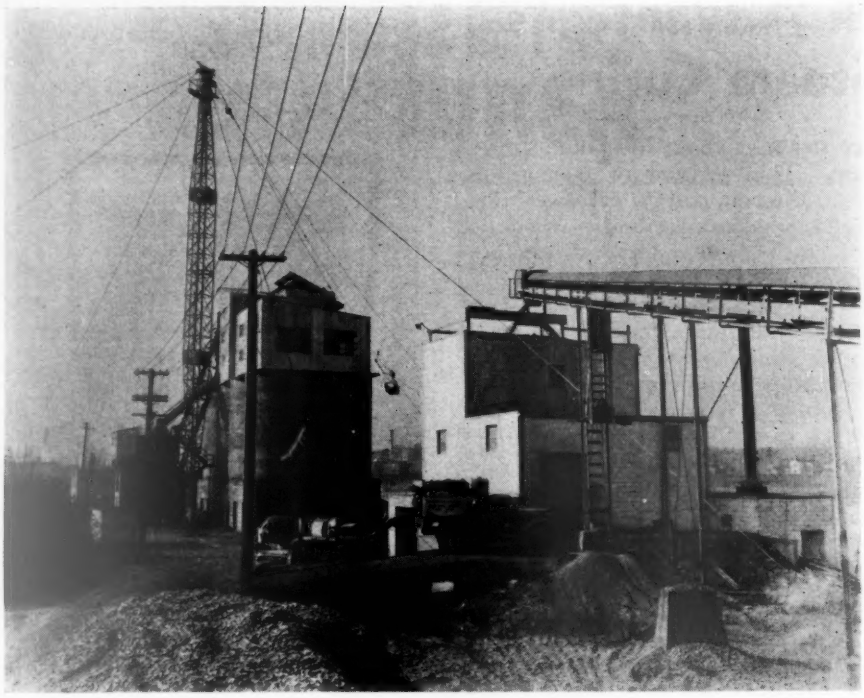
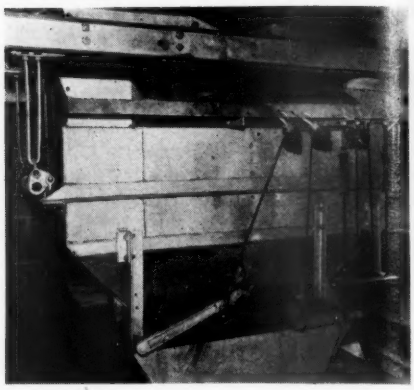



Chart showing relative shrinkage of ordinary and high-pressure-steam-cured units. Arrows indicate maximum shrinkage under normal conditions.



LEFT—Batching plant in foreground, gravel plant in background. BELOW—The 2½-ton gravel-weighing batcher.



# Gravel Producer Uses Large Share of Output in Ready-Mix Plant

another ON THE SPOT report

THE Hamilton Gravel Company, Hamilton, Ohio, has been a producer of sand and gravel since 1922. In 1936 it entered the ready-mixed-concrete business with a truck-mixer and a temporary batching plant. At intervals of six months two more mixers were purchased. The demand for this product then increased so rapidly that 4 new high-dump mixers were added within the next year. It was then decided to build a new permanent central batching plant and this went into operation in November, 1941.

In recent years about 90 per cent. of the sand and gravel produced has been used in the concrete plant. Most of the ready-mixed concrete sold has been for comparatively small projects, the largest being 3,000 and 5,000 cubic yards, and deliveries have been made up to 25 miles from the plant. The mixer fleet now consists of two 1½-cubic yard Jaeger horizontal-drum mixers on Ford chassis and a 2-cubic yard Jaeger horizontal and four 2-cubic yard Jaeger high-dump mixers on Chevrolet chassis.

The 1½-inch gravel and sand used for construction work are handled from the sand-and-gravel plant bins to a hopper. An adjustable gate controls the rate of feed of this material on the 20-inch by 185-foot Webster belt-conveyor which carries these materials to the top of the batching plant. The conveyor has a steel framework and is supported on steel bents with concrete footings. Goodyear conveyor belting is used. The aggregates are discharged through a revolving spout, controlled from ground level, into the two 85-cubic yard compartments of a Blaw-Knox steel bin.

The gravel is discharged through Blaw-Knox sliding gates into a 2-compartment Blaw-Knox 2½-ton capacity weighing batcher. If two sizes of coarse aggregates are required the bin can be arranged to feed these to the batcher. Under the sand bin there is a ¾-ton capacity Blaw-Knox weighing batcher. Both are equipped with beam scales.

In loading each truck-mixer makes two stops under this plant, one for gravel and one for sand, cement and water. The water is measured from a 200-gallon weighing tank near the sand batcher. This is supplied from a large tank which is automatically kept full by a 60-foot well pump. The cement is dumped from sacks into the mixer through a chute near the sand batcher.

In cold weather a 35-horsepower boiler is used to heat the mixing water and to supply steam for heating the aggregates through openings in the bins. Calcium-chloride is also used in the concrete when called for.

The central concrete batching plant. Aggregate conveyor at right.

General view of the Crew plant from the storage yard.

# Pioneer Block Maker Installs Modern High-Capacity Machine

another ON THE SPOT report

THE Crew Builders Supply Company, one of the outstanding building-material concerns in the Cincinnati area, has recently increased its concrete and cinder-block capacity by the installation of a Stearns No. 9 Joltcrete. This might with some accuracy be regarded as a renewed pledge of enduring confidence in the future of the concrete-block business, for Sidney I. Crew founded his company in 1907, when the block business was just commencing its long struggle to establish itself in the building trade. Mr. Crew has added many strings to his company's bow in the 37 years since he started business, but his most recent major equipment addition clearly indicates that concrete block will continue to play an important role in his operations.

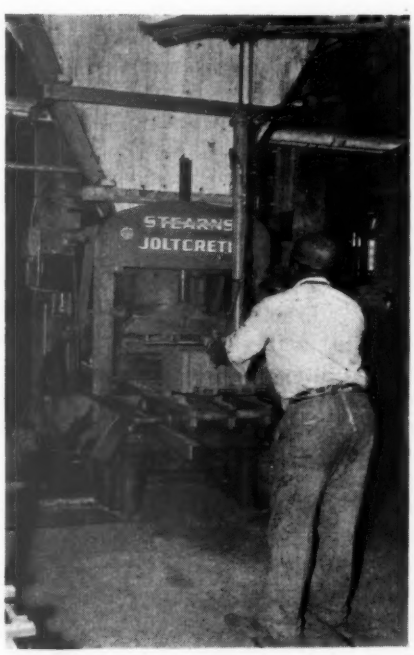
Sand, gravel and cement are brought into this plant by railroad, the cement in bags which are raised to the level of the mixer floor by a Jeffrey cement-bag elevator. The

**By WILLIAM M. AVERY**

aggregates are dumped into an undertrack hopper, from which they are conveyed to 4 overhead bins by a Columbus undertrack conveyor and a Columbus bucket-elevator with a swivel chute. A Columbus belt-tripper on the 24-inch shuttle conveyor over the bins makes it possible to direct the flow of material to the desired storage compartment. This arrangement of conveyors also handles aggregates for the company's ready-mixed-concrete and ready-mixed-mortar operations. The belting for the conveyor system was supplied by the Cincinnati Rubber Company.

The aggregates flow by gravity to stationary Blaw-Knox volume batchers. Two 21-cubic foot Ideal mixers operate on a shuttle track below the batchers, one mixer being used solely for concrete and other for making cinder units. A yield of 20 to 21 blocks per sack is obtained from a 2-sack batch.

The No. 9 Joltcrete, located on the ground floor level under the mixers, is fed by a 50-cubic foot timber chute to insure against production delays. It is used for 8-inch units only in straight, double-corner, single-corner and sash blocks, both concrete and cinder. Half-blocks are produced by the introduction of small ribs in the standard core box; the resulting shallow grooves in the sides of an otherwise standard block make it possible to halve the block on the job with a light hammer blow. It is claimed that this method of handling half-blocks has met with general approval among builders. Some economy in production cost is also effected.




The new block machine which has a capacity of 500 blocks per hour.

Both concrete and cinder blocks in 4-inch units are produced by an Anchor power stripper, using pallets and molds which are interchangeable with the Joltcrete. The pallets are made in the Star Foundry at Covington, Kentucky.

Concrete manhole blocks are produced on a special Anchor machine, and an Abrams Blue Ribbon downface machine is available for the production of rock-face units. The latter are faced with Lake Erie white sand and neat cement.

The blocks from the Stearns Joltcrete are handled by a pneumatic

Volume batchers and 21-cubic foot mixer.

off-bearer and loaded on racks mounted on flat cars, 54 units to the car. The 7 low-pressure steam-curing bins have a total capacity of 7,800 units. Concrete blocks lie, on the average, 18 to 20 hours in the bins, but the period is increased to from 35 to 40 hours for cinder units in order to hold breakage to the minimum. There are no sprays in the low-roofed bins, for the steam readily condenses to produce all the moisture required for curing.

A network of tracks makes it possible to unload the cars at any point in the storage yard. Under ordinary conditions of operating there is ample storage space in the yard to make

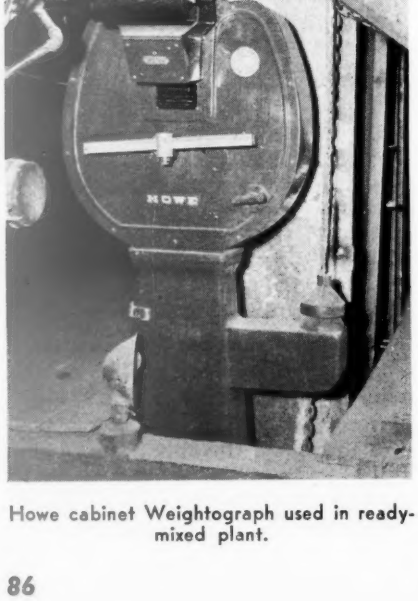
it possible to keep blocks for 30 days before shipping, but the shortage of manpower makes this practice difficult at present, for the plant is producing only 2,800 to 3,000 units per day. The Joltcrete alone, operating at capacity, can produce 4,000 units per 8-hour day.

Cinder blocks for back-up units constitute not over 10 per cent. of the present production. Cinders

Loading bags of cement from company truck to elevator.

come into the plant by railroad fully prepared and no crushing or grading is required.

Although the Crew Builders Supply Company was organized originally to produce concrete blocks, this is now only one of many activities carried on. The company's ready-mixed-concrete operations utilize 12 Jaeger truck-mixers of 2½- and 3-cubic yard capacities, and in normal times its ready-mixed-mortar service would constitute a small thriving business in itself. A complete line of masonry materials is carried in stock, including sewer




Howe cabinet Weightograph used in ready-mixed plant.

pipe, firebrick and industrial plasters, and the retail coal business averages 15,000 to 18,000 tons per year. For the past two years virtually all the company's sales have been made to industrial users and to housing projects in the Cincinnati area.

Mr. Crew's son, Sampson I. Crew, is now general manager of the concern, leaving his father free to devote more time to the Crew racing stables, an interest dating back to some 30 years ago, when Mr. Crew owned several trotting horses. The *Kosmos News,* published by the Kosmos Portland Cement Company, recently devoted considerable space to Mr. Crew's racing activities.

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**Cinder Block** *(from page 83)*

moisture content, will shrink 0.45 inch per 100 feet, as compared to 0.20 inch for the high-pressure-cured block. This moisture change would approximate that in exterior exposed blocks changing from a saturated condition to a normally dry condition. For interior exposed blocks such as those used for partitions the moisture content might drop as low as 5 per cent. The shrinkage from a saturated condition would be 0.60 inch for the ordinary cinder block as compared to only 0.25 inch for the high-pressure block. Under no conceivable conditions can the high-pressure blocks shrink more than 0.33 inch per 100 feet. According to Mr. Ferguson, little can be gained by attempting to deliver blocks dry at the job as at least 90 per cent. of the time rain would raise their moisture content either before laying, or after they are laid but before they are waterproofed or roofed over. The excessive moisture content caused the old blocks to expand and when the wall dried out the excessive shrinkage would almost inevitably cause cracking.

In addition to its painstaking production methods the company further insures the quality of its products by a series of tests which are made in its own well-equipped laboratory. The equipment used even includes a 200,000-pound compression-testing machine. Further precautions are taken by observing, wherever possible, the laying of the blocks and the company supplies to all its customers a complete, but brief and understandable set of specifications for doing this work. These specifications advise against the use of any mortar with excessive shrinkage. They recommend the use of Master Builders Company "Mortar proofing," or any other approved prepared mortar.

During the war period the company's line of blocks has been cut to those few most vitally needed but the full line will again be made when conditions return to normal. Before the war the company also made high-pressure, steam-cured lintels, joists, and floor and roof slabs but the making of these products has been discontinued for the duration. A large amount of cinder-concrete cast-stone work was also done and when production of this material is resumed it will also be high-pressure steam-cured.

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## W. G. Kaiser Heads New P.C.A. Farm Bureau

Because of the increased use of concrete-products in the farm field, the Cement Products Bureau of the Portland Cement Association, Chicago, has been reorganized. William G. Kaiser, who has headed the bureau for more than 15 years, has been made manager of the newly-formed "Farm Bureau" while John A. Ruhling, formerly Mr. Kaiser's assistant, is now manager of the "Housing and Cement Products Bureau."

This arrangement will enable Mr. Kaiser to concentrate all his attention on the broad aspects of farm promotion while Mr. Ruhling will be concerned with urban housing, masonry contractors and concrete-products manufacture.

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## Indiana Firm Building New Ready-Mixed Plant

Charles P. O'Leary, president of the Terre Haute Concrete Supply Corporation, Terre Haute, Indiana, announces that a new plant has been contracted for, with construction to start at once.

The contract for installation and erection of the new ready-mixed-concrete plant has been let to the C. S. Johnson Company of Champaign.

The corporation will build much larger quarters and storage facilities at its present location at Tenth and Chestnut Streets.

Officers of the organization, besides the president are John F. Kelly, vice-president; Roy White, secretary; Louis Hart, treasurer, and Charles F. Connelly, a director.

# ASTM Meeting Reveals Mounting Interest in Air-Entraining Cements

By C. E. PROUDLEY

Chief Materials and Testing Engineer
North Carolina State Highway and
Public Works Commission

another P&Q exclusive

THE annual meeting of the American Society for Testing Materials, held in New York June 29 and 30, revealed that interest in air-entraining cements continues to grow and more confidence seems to be placed in this relatively new type of concrete with its more extensive use and studies of the properties of concrete containing air-entraining agents. Throughout the reports of Committee C-1 on Cement and C-9 on Concrete and Concrete Aggregates data were presented and practical experiences related which tend to crystallize the scope of useful purposes for air-entraining cement. Such progress is indicated by the revision of the Tentative Specifications for Treated Portland Cement for Concrete Pavements (C175-42T), which eliminates the tension test as not feasible under present test methods, and adds a new air-entraining agent, Darex, as acceptable. In line with the more extensive use of air-entraining cements is the necessity for specifications, newly recommended as tentative, for determining the air content of Portland-cement mortar and for determining Vinsol-resin in cement. A chemical method for the determination of Darex is being studied by the Working Subcommittee of Committee C-1 on Methods of Chemical Analysis.

In spite of the demands of war activities time has been found by the members of the various committees to make much-needed changes in the setup of specifications. Committee C-1, under the chairmanship of P. H. Bates, chief, Clay and Silicate Products Division, National Bureau of Standards, has separated the methods of sampling and testing Portland cement (C77-40) into seven individual specifications which, although the same in substance, can be more readily considered for subsequent revisions.

**Cement Specifications** Efforts are being directed by Committee C-1 as well as others to coördinate the specifications of the A.S.T.M. and those of the Federal Specifications Board. This is being done in the Standard Specifications for Portland Cement (C150-42) where the compressive strength requirements of Types I and III cements are being revised to agree with SS-C-191b and SS-C-201a respectively. The Tentative Method of Test for Heat of Hydration of Portland Cement is being made to conform to SS-C-158a of the Federal Specification Board. The Masonry Cement Subcommittee headed by H. D. Baylor, vice-president, Louisville Cement Corporation, recommended similar changes affecting masonry cements to bring A.S.T.M. specifications in line with the federal specifications.

The changes in the Specifications for Portland Cement will not be applicable until the War Production Board's Order L-179 is rescinded. Such action by the W.P.B. may come as early as this fall and, as pointed out by Mr. P. H. Bates, chairman of Committee C-1, the newly revised specifications will be ready for immediate use. In the meantime the Emergency Alternate Specifications for Portland Cement remain unchanged upon the recommendation of the Technical Advisory Committee of C-1 under the chairmanship of J. L. Miner, vice-president of the Atlas Lumnite Cement Company, to the War Production Board.

**Sulphate Resistance** Culminating many years of study of the sulphate resistance of Portland-cement concrete, D. G. Miller, senior drainage engineer, Soil Conservation Service, U. S. Department of Agriculture, proposes a specification for a test method for the resistance of Portland cement to sulphate action. Before submitting it for the committee's approval, however, he plans to make another series of tests to confirm the indication that sodium sulphate gives more reproducable results than magnesium sulphate.

**Foreign Cements** In these days of global outlook comparisons have extended even to the characteristics of Portland cement. Eugene V. Barrett, chief, Materials Testing Laboratory, Ministry of Public Works of Venezuela, Caracas, Venezuela, was present to point out similarities in the chemical and physical properties of Portland cements from all parts of the world as represented by 52 brands from 15 countries. M. A. Swayze, director of research, Lone Star Cement Corporation, in commenting on the data said that it was probably beneficial for us, who feel we are superior in our knowledge and use of Portland cement, to have our attention brought to the fact that countries in Europe and South America are doing equally well or better. Brands from Venezuela and Yugoslavia show very high strength characteristics, whereas the 9 brands from Germany are about the average of the 52 brands, and the 3 from Japan included the poorest of all.

**Vinsol Resin** *The Reaction of Vinsol Resin as It Affects the Air-Entrainment of Portland Cement Concrete* was presented in a paper by C. E. Wuerpel, with Albert Weiner as co-author, engineer-in-charge and assistant engineer, respectively, Central Concrete Laboratory, Corps of Engineers, U. S. Army, Mt. Vernon, New York. In this it was shown that the method of intergrinding flake Vinsol resin fails to allow any control of air-entrainment due to the uncertainty of the amount and activity of the alkali which may be present during the concrete-mixing operations. However, when neutralized Vinsol resin (sodium resinate) is interground with the cement the amount of entrained air shows good correlation with the amount of Vinsol resin.

**Lime Finishing** W. C. Voss, head, Department of Building Engineering and Construction, Massachusetts Institute of Technology, who is chairman of Committee C-7 on Lime, presented the report for his committee, which has been busy with the revision of several tentative standards and the proposal of several new tentative standards, most important of which is a Tentative Specification for Special Hydrate for Finishing. The present Tentative Specification for Masons' Hydrate (C6-31T) is amended to function as a specification for Normal Hydrate. The Standard Meth-

ods of Chemical Analysis (C25-29) is revised with respect to details of the rapid sugar test. A new specification for test for arsenic is recommended as tentative.

**Cement-Lime Mortars** A study of the *Effect of Certain Variations in Consistency and Curing Conditions on the Compressive Strengths of Cement-Lime Mortars* was reported by A. J. Fink, research associate for the National Lime Association. Cement-lime ratios ranging from 1:¼ to 0:1 were used and it was found that when Portland cement was present the drier mixes gave higher strengths; for straight-lime mortars the reverse was true. The curing conditions investigated were: (1) damp closet for 28 days; (2) damp closet 7 days, water 21 days; (3) damp closet 7 days, water 18 days, laboratory air 3 days. Specimens containing lime gave better strengths in damp air than in water; air-drying for 3 days immediately prior to testing resulted in much higher strength. In discussing the paper B. E. Kester mentioned tests made in the U. S. Gypsum Company's laboratory in which lower strengths for cement-lime mortars were obtained for the proportions covered by Mr. Frank's tests. He pointed out also that they had found strength differences of as much as 10 per cent. for different brands of Portland cement. Dolomitic limes in damp curing gave lower strengths covered by Mr. Frank's tests. He recommended that either weight proportioning be used or figures more representative of practical unit weights of lime and sand be substituted for the present erroneous assumptions.

In a brief report Committee C-12 on Mortars for Unit Masonry proposed a revision of the Tentative Specifications for Mortar for Reinforced Brick Masonry (A.S.T.M. Desig. C161-41T), also the advancement of the Tentative Specifications for Aggregate for Masonry Mortar (C144-42T) to Standard.

**Masonry Units** Manufactured masonry units received their share of attention by Committee C-15 under the chairmanship of D. E. Parsons, chief, Masonry Construction Section, National Bureau of Standards. Seven standard specifications and one definition were reaffirmed as standards. In addition the Tentative Specification for Glazed Building Units (C126-39T) was revised extensively. The specification for Building Brick (made from clay or shale) (C62-41T) was advanced to Standard. Several tentative revisions for Hollow Load-Bearing Concrete-Masonry Units (C90-39; ASA A79.1-1942) and for Methods of Sampling and Testing Brick (C67-41; A82.1-1942) were adopted.

**Thermal-Insulating Cements** Thermal-insulating cements accounted for five new tentative standards under the sponsorship of Committee C-16. These included specifications for 85-per cent. magnesia thermal-insulating cement; long-fiber asbestos thermal-insulating cement; mineral-wool thermal-insulating cement; exfoliated-mica thermal-insulating cement; and diatomaceous-silica thermal-insulating cement for use in temperatures from 1,200 to 1,900 degrees F. E. T. Cope, Edison Electric Institute, University of Michigan, as chairman of Committee C-16 on Thermal Insulating Materials presented the report and referred to the interest which Sub-committee VI on Thermal Conductivity has created. Many requests for details of methods and apparatus have been received although practically no work has been done by this subcommittee since its chairman, Lieut. Comdr. F. C. Houghten, has been occupied with his duties in the U. S. Navy.

**Concrete Aggregates** Much - needed revisions were made by Committee C-9 on Concrete and Concrete Aggregates in the form of the specifications for making and testing concrete cylinders and beams. It is probable that the following will become standards immediately after a canvass of letter ballots on them by the society:

C31—Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field.

C39—Method of Test for Compressive Strength of Molded Concrete Cylinders.

C42—Methods of Securing, Preparing, and Testing Specimens from Hardened Concrete for Compressive and Flexural Strengths.

C78—Method of Test for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).

C138—Method of Test for Weight Per Cubic Foot, Yield, and Air Content (Gravimetric) of Concrete.

**Soundness Tests** Revisions were made in other standard specifications which were also recommended for immediate adoption as standard. They were the addition of a section on soundness to the requirements for fire aggregate in Standard Specifications for Concrete Aggregates (C33-42). Magnesium sulphate as an alternate for sodium sulphate is to be permitted in testing both fine and coarse aggregates for concrete. The Standard Method of Test for Structural Strength of Fine Aggregate Using Constant Water-Cement-Ratio Mortar (C87-42) has been revised to provide 10 drops of ½ inch in 10 seconds when measuring the consistency of the mortar by means of the flow table instead of the 30 drops of ⅛ inch in 30 seconds heretofore specified. The Standard Method of Test for Coal and Lignite in Sand (C123-39) was revised in order to separate the floating particles on a 30-mesh instead of 6-mesh sieve and to use liquid of a specific gravity of 2.0 instead of 1.58. A note was added requiring that the heavy liquid be washed off with $CCl_4$ before making the final weighing.

The impetus given to the use of liquid coating curing compounds for concrete by the shortage of burlap, cotton mats, paper, etc., has revived interest in the Test for Efficiency of Materials for Curing Concrete (C156-40T). Revisions were proposed to make the test method more applicable to the testing of waterproof membrane types of curing compounds.

**Air Content of Concrete** As a part of the report of Committee C-9, J. C. Pearson, director of research, Lehigh Portland Cement Company, presented a paper describing a volumetric test method for determining the air content of freshly mixed concrete. Comparisons were made of results obtained by the volumetric method with those of the gravimetric method (C173-42T) and by computation. Mr. Pearson stated that it was the conviction of their operators that the volumetric method gives nearly as dependable results as the standard method and requires less time and computation. It is especially convenient in the field.

**Sand-Soundness Tests** Professor H. Walter Leavitt, secretary, Maine Technology Experiment Station, University of Maine, presented a paper by Andrew Adams, senior engineer, Bridge Division, Maine State Highway Commission, and H. A. Pratt, assistant engineer, Maine Technology Experiment Station, University of Maine, on *A Comparison of Results of Sieving Procedures*

*in Soundness Tests on Maine Sands* in which the relative advantage of using half-size sieve openings for determining the percentage of disintegration in the magnesium-sulphate soundness test was compared with the present standard method. Their conclusion was that either the present standard method or the use of half-size sieves gave equally good indications. From these tests there would seem to be no advantage in revising the method.

**Fly Ash as Substitute** Harry A. Frederick, assistant materials division chief, Public Service Electric and Gas Company, Maplewood, New Jersey, told of the improvement of lean concrete mixes (2.64 bags of cement per cubic yard of concrete) by the use of fly ash as a substitute for sand and cement. The concrete was intended primarily as a fill not requiring high strength. Workability was the most desirable factor. The replacement of 25 per cent. of the sand with fly ash was the optimum amount and resulted in a 113-per cent. increase in strength and a "very fatty" consistency. The substitution of fly ash for cement in any amount reduced the strength and failed to eliminate bleeding. It was his observation that the percentage of carbon in the fly ash had no effect on either the consistency or the strength of the concrete mix.

**Effects of Entrained Air** Considerable interesting discussion followed the presentation of a paper on *Entrained Air—Its Effect on the Constituents of Portland-Cement Concrete,* by Henry L. Kennedy, manager, Cement Division, Dewey & Almy Chemical Company, Cambridge, Massachusetts. The effect of air-entraining agents on neat-cement paste was studied both for physical properties and as seen under a microscope. Fine aggregates of various sizes were mixed with air-entraining agents and examined for added air. The No. 50 to No. 100 mesh size of sand produced the highest percentage of air-entrainment, and for this size and the No. 30 to No. 50 mesh size the air bubbles were observed under the microscope to cling to and separate the sand particles thereby providing excellent lubrication. Sizes finer than No. 100 sieve did not behave in the same manner. In conclusion Mr. Kennedy stated that the amount of entrained air may be varied by the gradation of the fine aggregate even though the amount of air-entraining agent remains constant. It seems possible that the importance of the presence of a minimum amount of sand passing the No. 100 sieve for ordinary concrete may be minimized when air-entraining agents are used. The mechanics whereby concrete containing entrained air resists rupture upon freezing are described in the paper.

Mr. Wuerpel told of work done in the Laboratory at Mt. Vernon, New York, to observe the freezing action microscopically and said that while ice was found in the voids in the concrete it was difficult to fill the voids with water.

Stanton Walker, director of engineering, National Sand & Gravel Association, referring to the strength reduction due to entrained air pointed out that the Talbot and Richart voids-cement theory developed many years ago seems likely to be tied in with the strength of air-entraining cement concrete. Mr. Wuerpel declared that the introduction of Vinsol resin, *per se,* did not necessarily reduce the strength of the cement. This was agreed to by Mr. Walker and Mr. Kennedy who expressed their belief that with proper care and adjustments the benefits of entrained air can be obtained without appreciable sacrifice in strength.

Sanford E. Thompson was present at the session on concrete and personally made the Fourth Annual Sanford E. Thompson Award to Douglas McHenry, engineer, Bureau of Reclamation, U. S. Department of Interior. His paper on *A New Aspect of Creep in Concrete and Its Application to Design,* presented before the society at the 1943 annual meeting, was selected as having outstanding merit in the field of concrete and concrete aggregates. Mr. Thompson told of the circumstances leading up to the establishment of the annual award, tracing the research activities of Committee C-9 since 1904. The award is possible through the unexpended remainder of a research fund administered by Committee C-9 which in 1938 was sufficient to warrant its application to the encouragement of research and study in the field of concrete and concrete aggregates. Sanford E. Thompson was the first chairman of Committee C-9.

**Concrete Compression Tests** The final session on concrete, presided over by Alexander Foster, Jr., vice-president, Warner Company, Philadelphia, began with a paper by three engineers of the Bureau of Reclamation, Denver, on *Precision Indices for Compression Tests of Companion Concrete Cylinders.* The paper was presented by Douglas McHenry for the authors, S. P. Wing, W. H. Price, and C. T. Douglass, who had found by comparing results of compression tests made in the Denver Laboratory, the Field Control Laboratory, and on the job that the companion cylinders were primarily a measure of the ability to mold, compact, cap, cure and test the specimens in a uniform manner. It was their opinion that a single specimen was sufficient for control purposes where laboratory conditions were satisfactorily controlled. However, they described a little-suspected source of discrepancy in strength results amounting to as much as 8 per cent., occurring from the effect of position of the specimens in their 100-per cent. fog room.

**Measuring Quality of Concrete** A novel method of measurement of the quality of concrete was suggested by Bailey Tremper, materials engineer, State of Washington Department of Highways. His paper, presented briefly by Stanton Walker, suggested the embedding of ½-inch round pull-out bars having ¾-inch diameter heads, in the concrete of the structure to a depth of 1¾ inches, $\frac{11}{16}$-inch being the length of the enlarged head. As determined in the laboratory a high degree of correlation appears to exist between pull-out and compression tests so long as the actual compressive strengths are not above 3,500 p.s.i. D. A. Abrams, consulting engineer, New York City, questioned the practicability of such a test for job use in view of the sensitivity of pull-out tests to the preparation and testing of specimens. C. E. Wuerpel commented along the same line, recalling experiences in which the slightest vibration of the bar in the unhardened concrete resulted in large variations in bond.

**Creep of Concrete** More data on the creep of concrete were given in a paper by C. Martin Duke and Harmer E. Davis, instructor and associate Professor, respectively, University of California, under the title *Some Properties of Concrete Under Sustained Combined Stresses.* Axial and lateral strain measurements were made in 8-by-16-inch cylinders using Carlson electric strain meters. An axial load of 500 p.s.i. was applied by means of an 8-inch diameter car spring and the lateral load of 250 p.s.i., when applied, was hydraulic, in a 10-inch-diameter standard steel pipe. Seven tubular concrete specimens were tested for creep in shear under torsional loading. The results of the

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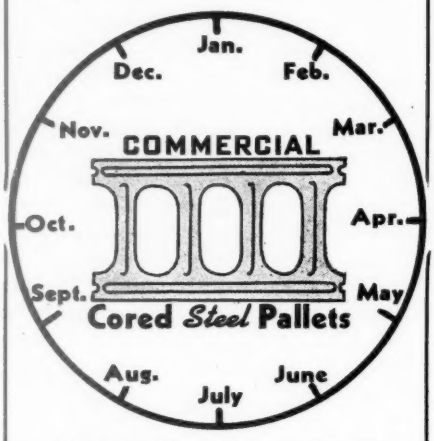


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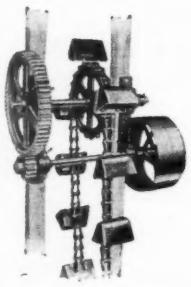
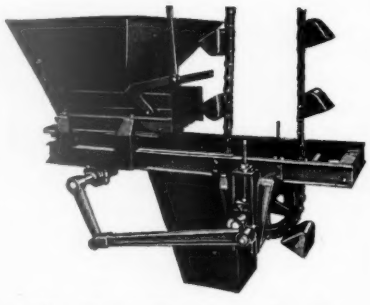


*Kent Top Drive*



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which the authors have done in their paper. Based upon the data they obtained and some previously reported data, they propose a method for estimating the approximate magnitude of creep under combined stresses from the results of measurements of creep under simple axial compression. The method of estimation is checked reasonably closely by the measured creeps during the first few weeks after loading.

**Modulus of Rupture**

*Tests Comparing Dynamic (Sonic) and Compression Modulus of Elasticity, Modulus of Rupture, and Compressive Strengths on a California Concrete Paving Project* were reported by Thomas E. Stanton, materials and research engineer, California Division of Highways, and presented briefly in his absence by H. F. Gonnerman, manager, Research Laboratory, Portland Cement Association. Determinations were made at 4, 10, and 28 days, 3, 6 and 12 months, using sets of 3 compression cylinders and 1 beam for each age. There was a close correlation at all ages between the dynamic E on both beams and cylinders but the secant E determined on the cylinders averaged considerably less than the dynamic E. It appears that the 28-day secant E at 1,000 p.s.i. averages approximately 62 per cent. of the dynamic E at the same age for conditions prevailing on this job. At 4 days the ratio of secant E to dynamic E was .34 and at one year .76.

The popularity of the dynamic or sonic method of determining the modulus of rupture of concrete beams is prompting investigators to examine various phases of the relationship. Ensign Philip G. Kirmser, instructor, Kansas State College of Agriculture and Applied Science, Manhattan, Kansas, studied the effect of cracks in a specimen on the values of dynamic E. An experimental treatment using machined cast-iron beams, slotted to simulate cracks was compared with the mathematical analysis applying Rayleigh's method for determining the natural frequency of the beams. The paper points out that correlations between the loss in modulus of elasticity and other properties of concrete, notably modulus of rupture, are poorest in the case of beams which develop only a few cracks, whereas the best correlations are obtained where the deterioration of the beam is characterized by a weakening of the cement paste, the bond or the aggregate. It was the opinion of Mr. Kirmser that the most valuable conclusion based on his study tests are best presented graphically, thus far was the fact that a loss in modulus of elasticity as determined by vibrations always indicates a deterioration, but the type and extent of this deterioration are not certain.

## Report Indicates Extensive Home Building After War

Conditions indicating greatly increased home building after the war are being favored by the prolongation of government restrictions on critical materials and the accelerated accumulation of savings on the part of prospective home owners.

These general conclusions are reached in the report entitled, "Residential Building Potentials," published by F. W. Dodge Corporation, in which Thomas S. Holden, president of the Dodge Corporation and well-known authority on construction trends, points to primary conditions now existing and favoring extensive home building when government restrictions are removed.

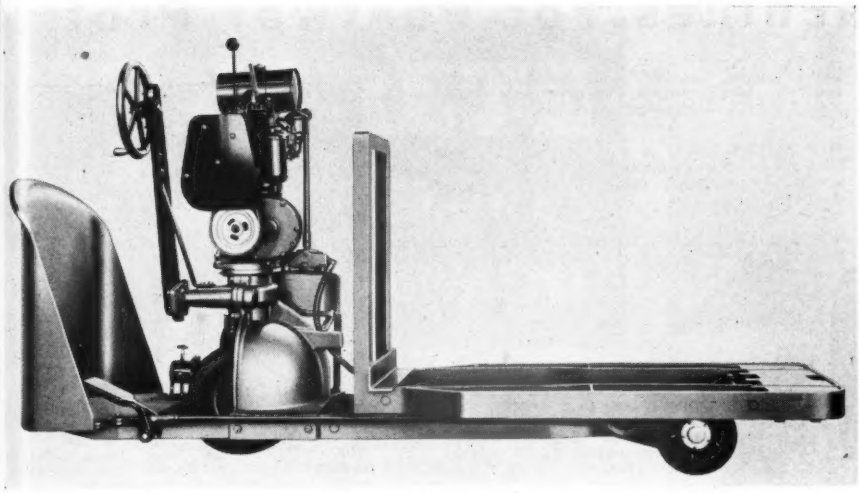
Conditions favoring increased home ownership in the postwar decade, according to Mr. Holden, are: (1) anticipated prosperity, with widespread purchasing power, sizable amounts of which are already earmarked for home purchases or down payments; (2) favorable mortgage market and purchase terms, and (3) probable continuation of population trends toward suburbs and outlying areas.

An important element in stimulating home construction is effective home planning promotion by well-managed savings institutions among their depositors, the study reveals.

Some of the findings of Dodge's latest survey, supplementing its previous postwar construction studies, published last year, are as follows:

Accumulated demand for houses is relatively greatest in the cost class banned by war restrictions, that is for homes costing $6,000 or more with land. A larger proportion of houses in middle and upper cost ranges would tend to increase the number built from architects' plans and specifications.

The first post-war year will be characterized by shortages of materials and by the general confusion of readjustment, possibly by hesitation as to price trends. Owing to numerous transition problems, it is likely that in the first twelve months after restrictions on house building are removed, there will be built only 350,000 to 400,000 new non-farm dwelling units, much below the average annual construction of 820,000 dwelling units estimated for the decade following the war.



One-ton industrial truck.

## ● Industrial Truck

A new Truck-Man, designed for moving skidded loads of one ton or under, introduces new features designed to provide safe, efficient moving of to-day's war materials and the materials of post-war to-morrow.

Easier, safer operation and greater flexibility have been built into the new, improved one-ton capacity Truck-Man, according to T. B. Funk, president of Yard-Man, Inc., Jackson, Michigan, the manufacturer.

One of the important improvements is a patented two-speed drive which makes both a low and a high speed instantly available. The low speed is adapted for starting, climbing ramps, going in and out of freight cars or other tight places, and for moving material over rough floors. For light loads and movement without loads, the high speed is instantly available. The Truck-Man turns in its own length.

Steering has been improved by the use of a large ball thrust bearing which reduces steering effort to but a fraction of the effort formerly required.

More comfort, with accompanying lessened fatigue, greater safety and increased efficiency for the driver is achieved by a new operator's seat, which has been developed in collaboration with the Safety Council of the Ford Motor Company in the Willow Run Bomber plant. In addition to providing a seat with a restful, form-fitting back, it provides a support when the operator is standing and it also serves as a protective shield for added safety. The use of this new seat is particularly advantageous when women operators are employed, according to reports from users.

The operation of the Truck-Man has been made still more dependable through the use of a new, more sensitive fly-ball type governor, which replaces the old pneumatic type. It is enclosed, and is much more sensitive in action. The entire unit is sealed so the operator cannot disturb it without breaking the seal.

Other improvements include heavier load wheels with a four-inch tread and a larger gas tank of one gallon capacity which provides sufficient fuel for eight hours of normal operation. "V" type belt, brakes automatically set when the machine is not in action, thus providing an added measure of safety.

The new Truck-Man has been designed to fill a highly specialized need in the more efficient handling of materials which were formerly handled by hand. With normal factory operations requiring the constant movement of loads in the under-one-ton class, the new Truck-Man is serving in virtually all modern industries, moving material faster, and thereby speeding production and lowering production costs.

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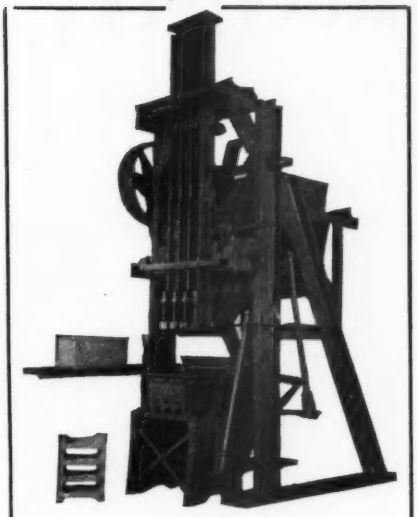
A. H. LONG, 75, owner and operator of the A. H. Long Cement Products Company, Suqualena, Mississippi, passed away recently at his home. He is survived by his two daughters.

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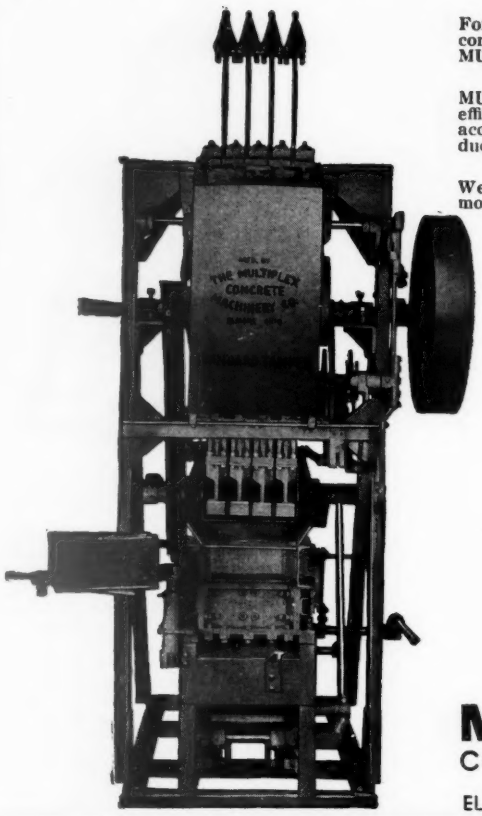

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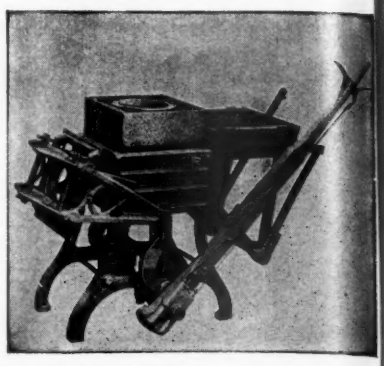
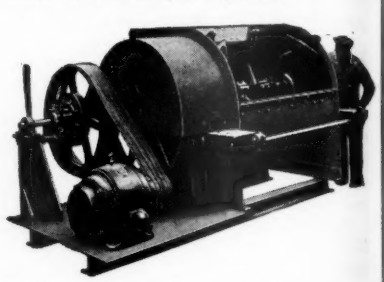


The MULTIPLEX Flue Block Machine makes ventilated, solid or lightweight units, including all attachments for ventilator and stove pipe openings.



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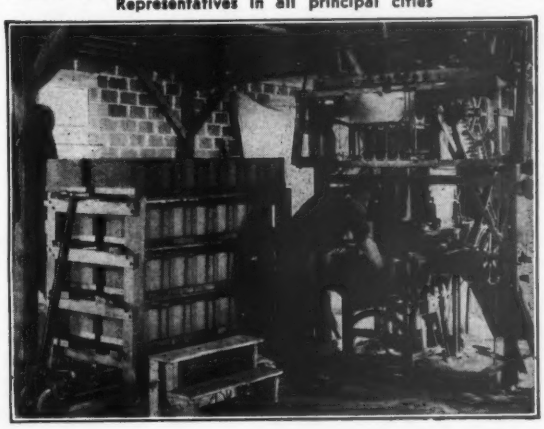



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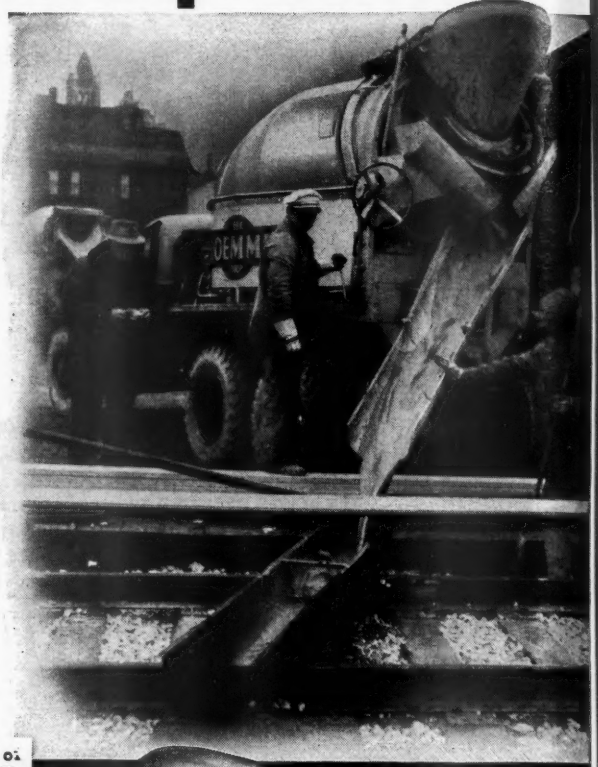

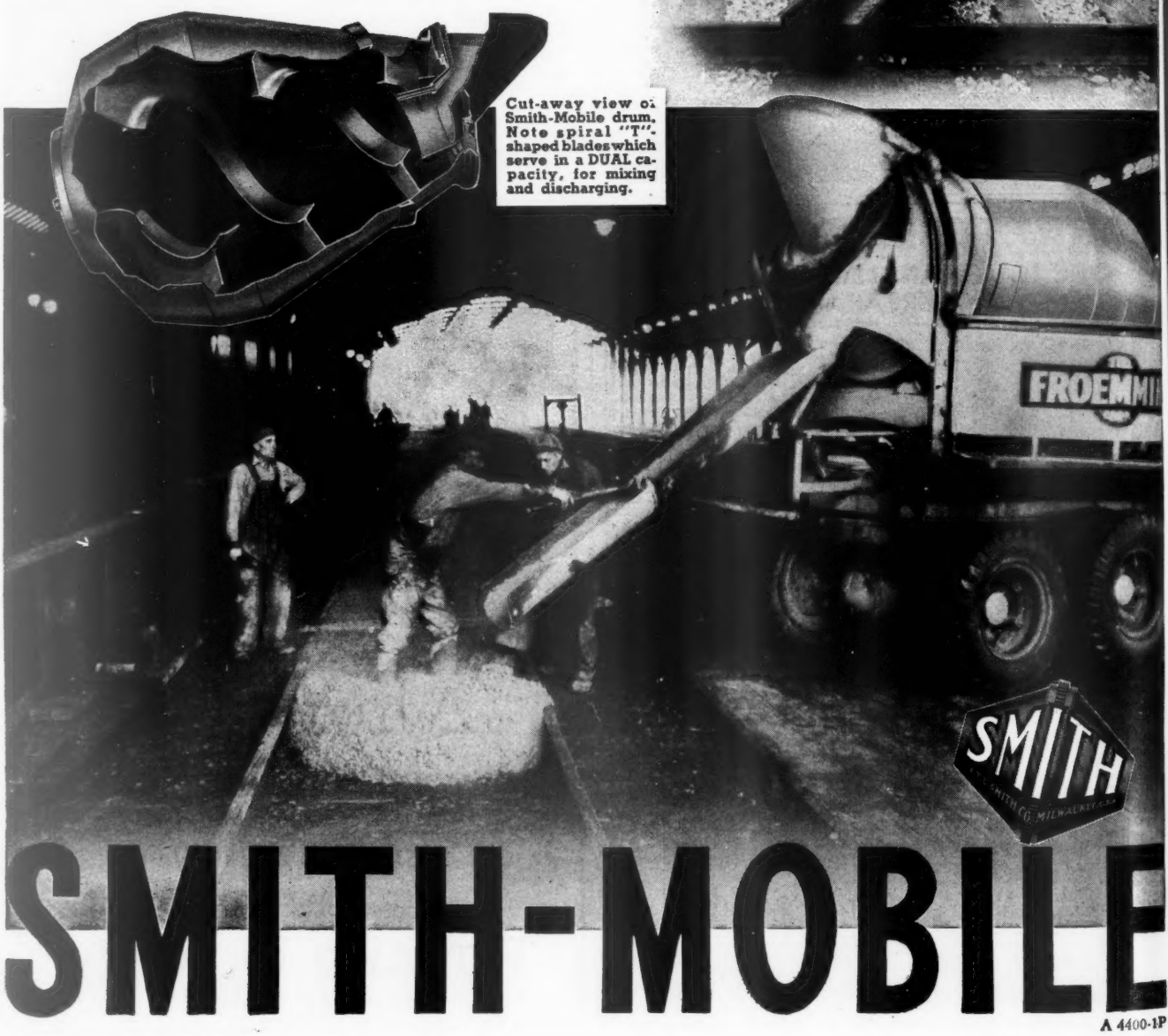


Cut-away view of Smith-Mobile drum. Note spiral "T"-shaped blades which serve in a DUAL capacity, for mixing and discharging.

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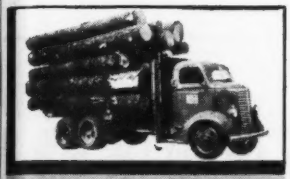

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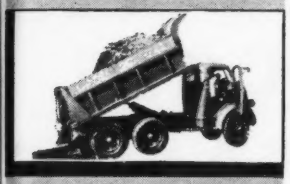

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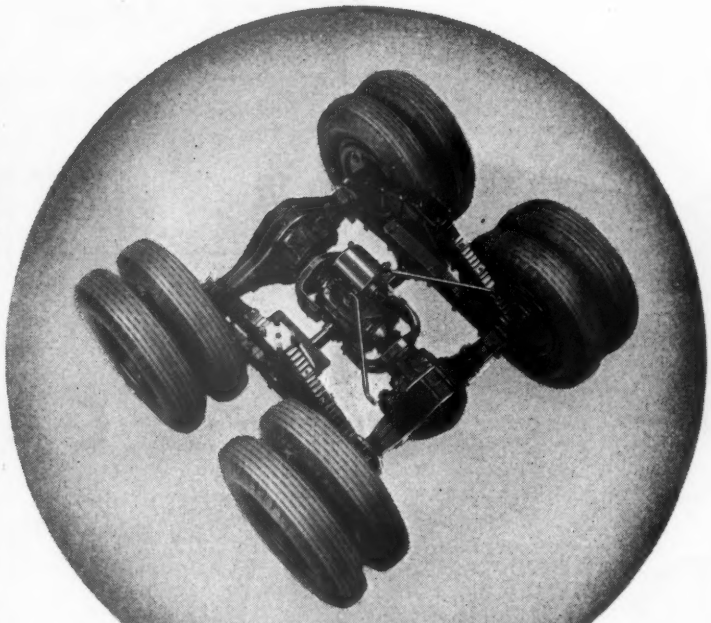
GENERAL HAULING



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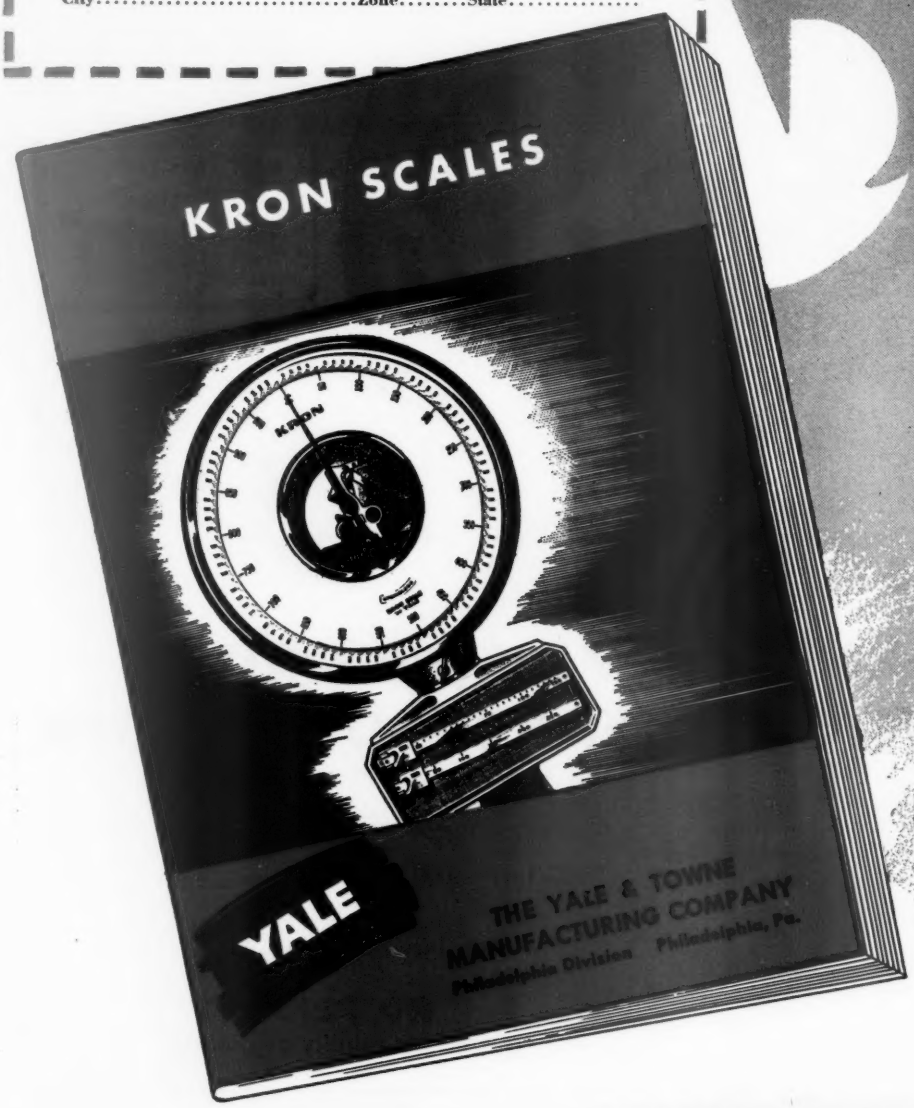


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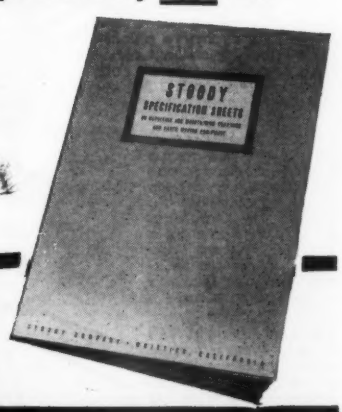


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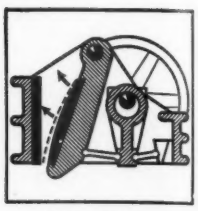
**Crushing Without Abrasion • Perfect Balance • Big Reduction Ratio • Large Capacity per Horsepower • Sealed, Dirt Free Lubrication • Simple, Positive Safety Device**

### LET'S SEE WHY IT IS IMPOSSIBLE TO BALANCE ORDINARY CRUSHERS—

It is an established fact that it is mechanically impossible to counter-balance reciprocating motion by circular motion. The Blake type crusher, shown at the right, has a *single* heavy swing jaw operated by a *single* pitman and toggles. Now let's analyze the motion in this machine. We will start with the eccentric and the pitman at the bottom of their stroke, the toggles pointing down and the jaw open. As the eccentric revolves, it lifts the pitman and the ends of the toggles. As the toggles lift and straighten out, they move the swing jaw toward the stationary jaw, at the same time swinging it *upward*. Note how all these heavy masses move *upward* together until the eccentric reaches the top—and then they all *come down* together. As there is no opposing reciprocating motion to counter-balance this heavy mass, this machine can never be balanced, and must be run slowly. Counterweights on the flywheel can only be used to balance the eccentric.

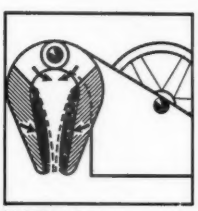


Blake Motion.

In the overhead eccentric type shown at the right, again we have two motions—Circular and Reciprocating. In this machine we have a *single* jaw which moves *downward* and, at the same time, toward the stationary jaw. Then it moves *up* and away from the stationary jaw. The toggle is also unbalanced. Here again there is no opposing reciprocating motion for counter-balancing. Counter-weights on the flywheel can never balance this mechanism, so speeds and output must be low. As crushing is only done during crushing strokes, fewer crushing strokes mean less crushed rock.

Overhead Eccentric Motion.

Now see how every moving part on a KUE-KEN is counter-balanced by another part of equal weight moving in the opposite direction. First consider the eccentric shaft with its circular motion. There are two outer eccentrics, each half the weight of the single center eccentric. The throws on these two outer eccentrics are equal to and opposite to the center eccentric. Therefore the shaft itself is in perfect balance. Note that this is circular motion counter-balanced by circular motion. On the center eccentric there is one pitman, while both outer eccentrics have pitmans with a total weight equal to the center pitman. As the center pitman moves up, the outer pitman move down. Again we have perfect balance with reciprocating motion counter-balanced by reciprocating motion. Now consider the long pendulum type jaws with the upper hinge pin over the center of the crushing zone. As shown at the right, see how the jaws travel to and from each other in unison, with practically no lifting. Again we have perfect balance, reciprocating motion counter-balanced by reciprocating motion. This perfect balance, possible only in a KUE-KEN, reduces power and weight. It eliminates heavy flywheels and massive foundations and permits high speed efficient crushing.



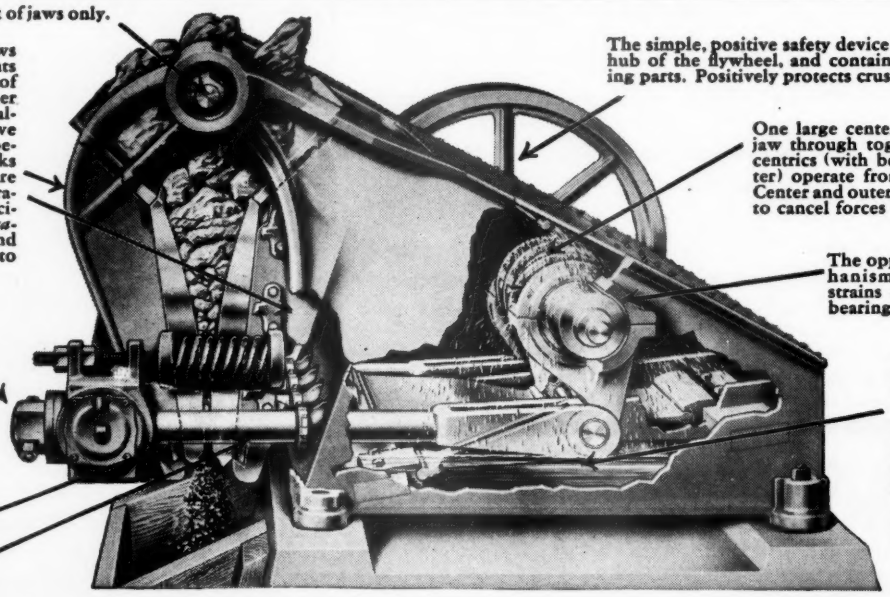
KUE-KEN Crusher.

**Hinge pins support weight of jaws only.**

Two long symmetrical jaws hinged at the top. All points travel downward in an arc of circle as they move together in unison and perfect balance. As there is no relative up or down movement between the jaw plates, rocks are crushed by pure pressure without rubbing or abrasion. This exclusive principle of *crushing without abrasion* uses less power and makes jaw plates last five to ten times longer.

Accessible nuts are positively located on each side rod, locked in one position to prevent unequal adjustment. To change jaw opening, merely remove nuts and add spacers (furnished in various thicknesses), and replace nuts to locked position.

The exclusive KUE-KEN design of rear jaw plate lugs, which permits jaw plates to be worn entirely away without wear on jaw stock itself.



The simple, positive safety device is not visible. It is in the hub of the flywheel, and contains no shearing or breaking parts. Positively protects crusher from tramp iron, etc.

One large center eccentric operates rear jaw through toggles, and two outer eccentrics (with bearing area equal to center) operate front jaw through toggles. Center and outer eccentrics are 180° apart to cancel forces and balance mechanism.

The opposed and balanced mechanism eliminates crushing strains on the shaft and frame bearings.

In *addition* to the splash lubrication, cool oil is pumped from the large dust tight, sealed oil reservoir through an integral filter and then into the shaft bearings and toggles, giving perfect lubrication. A pressure switch automatically stops the crusher if oil supply should fail.

# STRAUB MANUFACTURING CO.

**453 CHESTNUT STREET**
**OAKLAND 7, CALIFORNIA**

KUE-KEN BALANCED CRUSHERS • RIB CONE BALL MILLS • SCREENWHEEL CLASSIFIERS • OVERHEAD ECCENTRIC CRUSHERS
FEEDERS • AMALGAMATION BARRELS • CONCENTRATING TABLES • SPIRAL CLASSIFIERS • STANDARD OR SECTIONALIZED

*Pidanos Catalogo Espanol*

# You wouldn't put splints on a TOE DANCER

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The preforming process frees LAY-SET Wire Rope of muscle-bound stresses. Being preformed, Hazard LAY-SET is not hampered by needless strains. Rather, every wire and strand is free to do its full share of work from the very first hour it is put on your machine.

Hazard LAY-SET Preformed is a "pre-broken-in" rope; it resists snarling and kinking; it handles easier, faster, safer and cheaper. It possesses high resistance to bending fatigue and so lasts longer—much longer than non-preformed wire rope. Regardless of where or how you use wire rope, whether for running or standing service, specify Hazard LAY-SET Preformed—the rope that gives you greater dollar value.

Hazard LAY-SET Preformed Wire Rope is "in the service" on countless jobs for the Armed Forces where it is proving its many advantages. Specify it for *your* use.

HAZARD WIRE ROPE DIVISION • Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, INC. • BRIDGEPORT • CONNECTICUT

**HAZARD LAY·SET *Preformed* WIRE ROPE**

# POSTWAR PLANNING HEADQUARTERS

## *Your* Nearby A-W Distributor

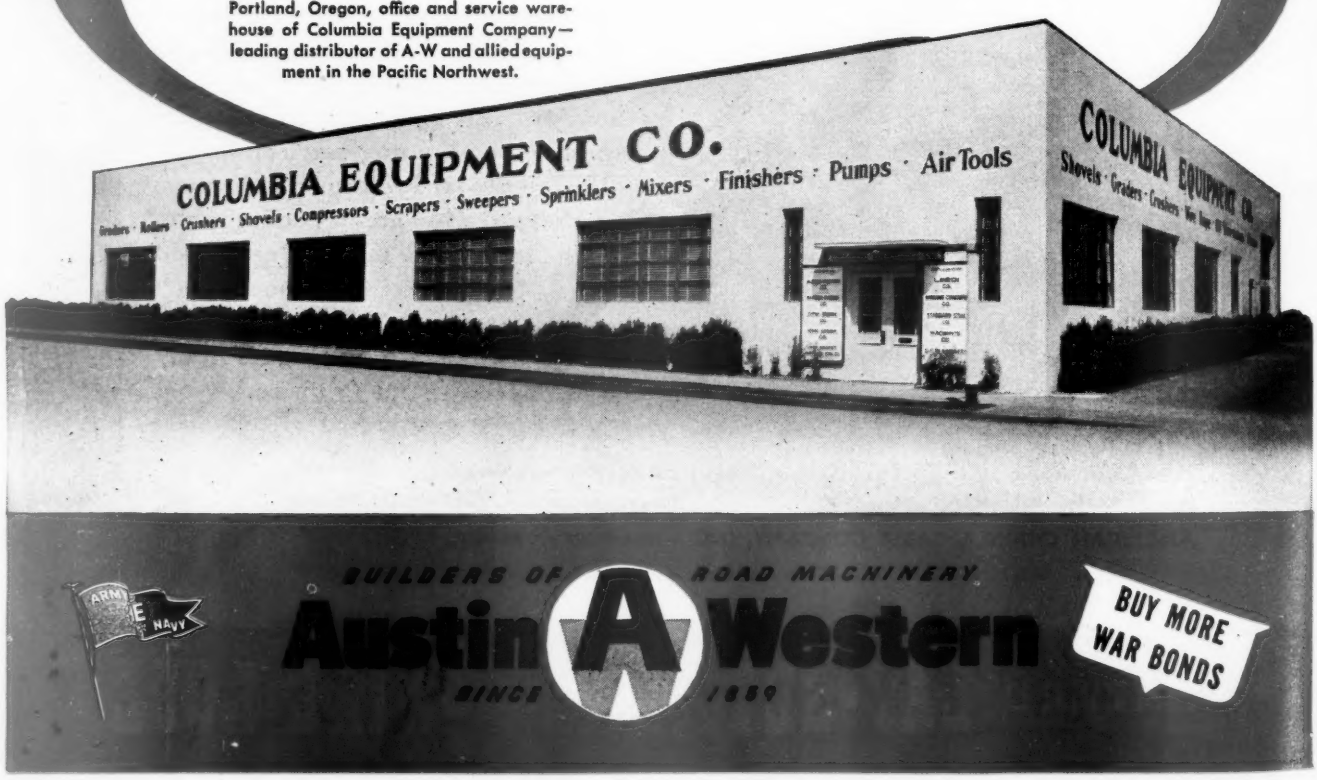
To HIS primary wartime job of keeping construction machinery in fighting trim . . . a job he has demonstrated his ability to bring to a successful conclusion . . . the Equipment Distributor is adding a new job . . . and a mighty pleasant one . . . that of helping his customers and friends plan for postwar.

Many developments are still under cover, but information on new and improved machines is beginning to reach the distributor from the manufacturer . . . information that will lead to more efficient highway department operating practices . . . to added profit for the contractor.

More than ever, your Austin-Western distributor is a good man to know.

**AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.**

Portland, Oregon, office and service warehouse of Columbia Equipment Company—leading distributor of A-W and allied equipment in the Pacific Northwest.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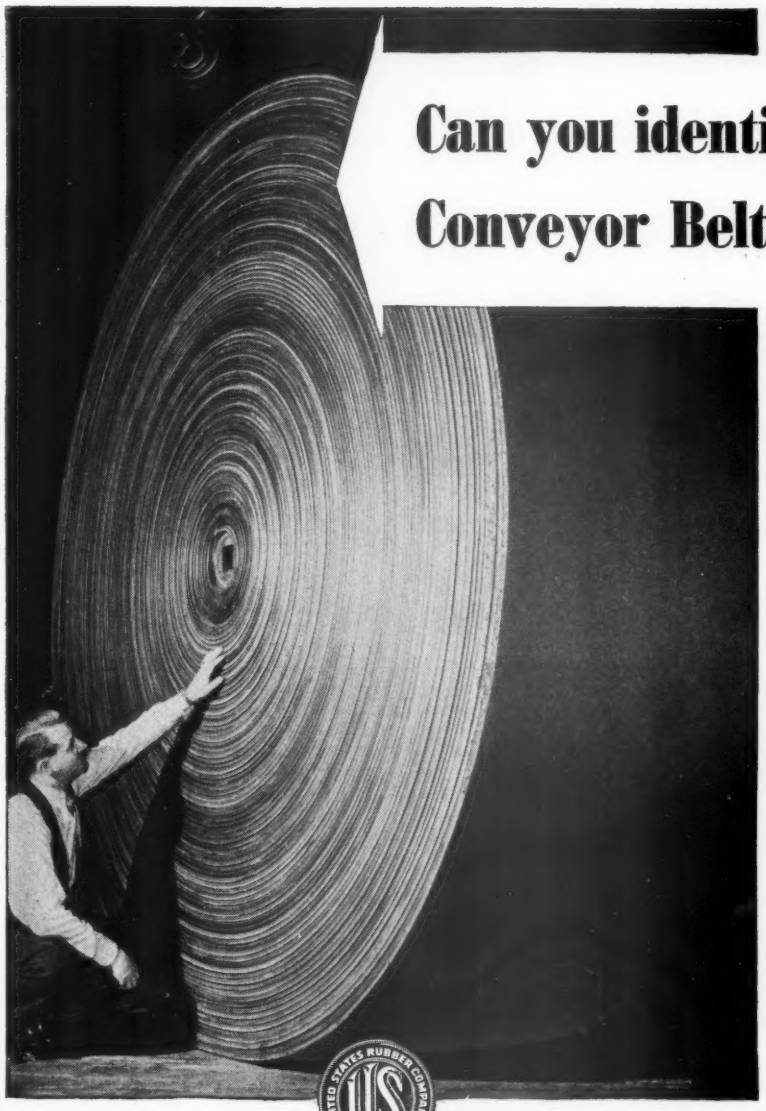


# Can you identify a Synthetic Rubber Conveyor Belt by looking at it?

No, to the eye, a synthetic rubber conveyor belt looks exactly like one made of natural rubber. Nor can you judge by its looks how much compounding skill has gone into it, how carefully it has been fabricated, to what rigid tests and inspections it has been put.

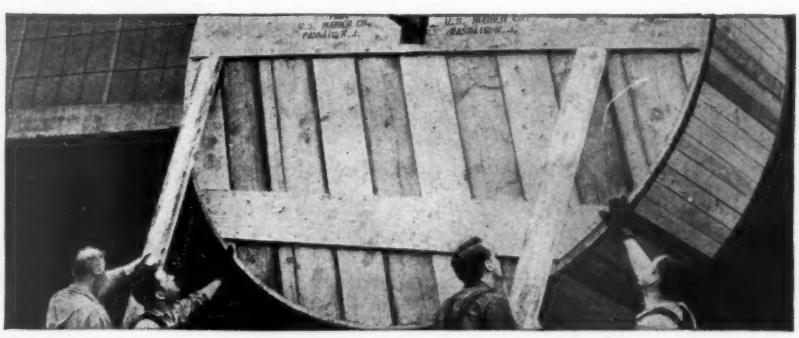
These are the things that determine the tonnage a belt will convey during its life, the trouble-free service it will deliver, the savings it will effect in operation.

The one safe guide is the maker's name. U.S. Rubber Conveyor Belts have long enjoyed the highest reputation. The "U.S." Belts of synthetic rubber are upholding that reputation. Each is individually designed...each engineered from the scene of action for a particular installation.

"U.S." Synthetic Rubber Belts are the result of unremitting research, of accumulated technical knowledge, of skillful craftsmanship applied through modern, scientific laboratory and manufacturing facilities.

*SERVING THROUGH SCIENCE*

**LABORATORY CONTROL**—is a basic rule in the compounding of materials for U.S. Rubber Conveyor Belts. The particular type of synthetic rubber to be used is determined by the service conditions to be met; the ingredients are mixed with scientific exactness.



**A GIANT GOES FORTH**—Crated and ready for shipment this big fellow is on its way into service at an important coal mine. U.S. Rubber Conveyor Belting—hundreds of thousands of feet of it—is helping to handle big loads of vitally important products such as coal, limestone, ore and other bulk materials.

*Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.*

## UNITED STATES RUBBER COMPANY

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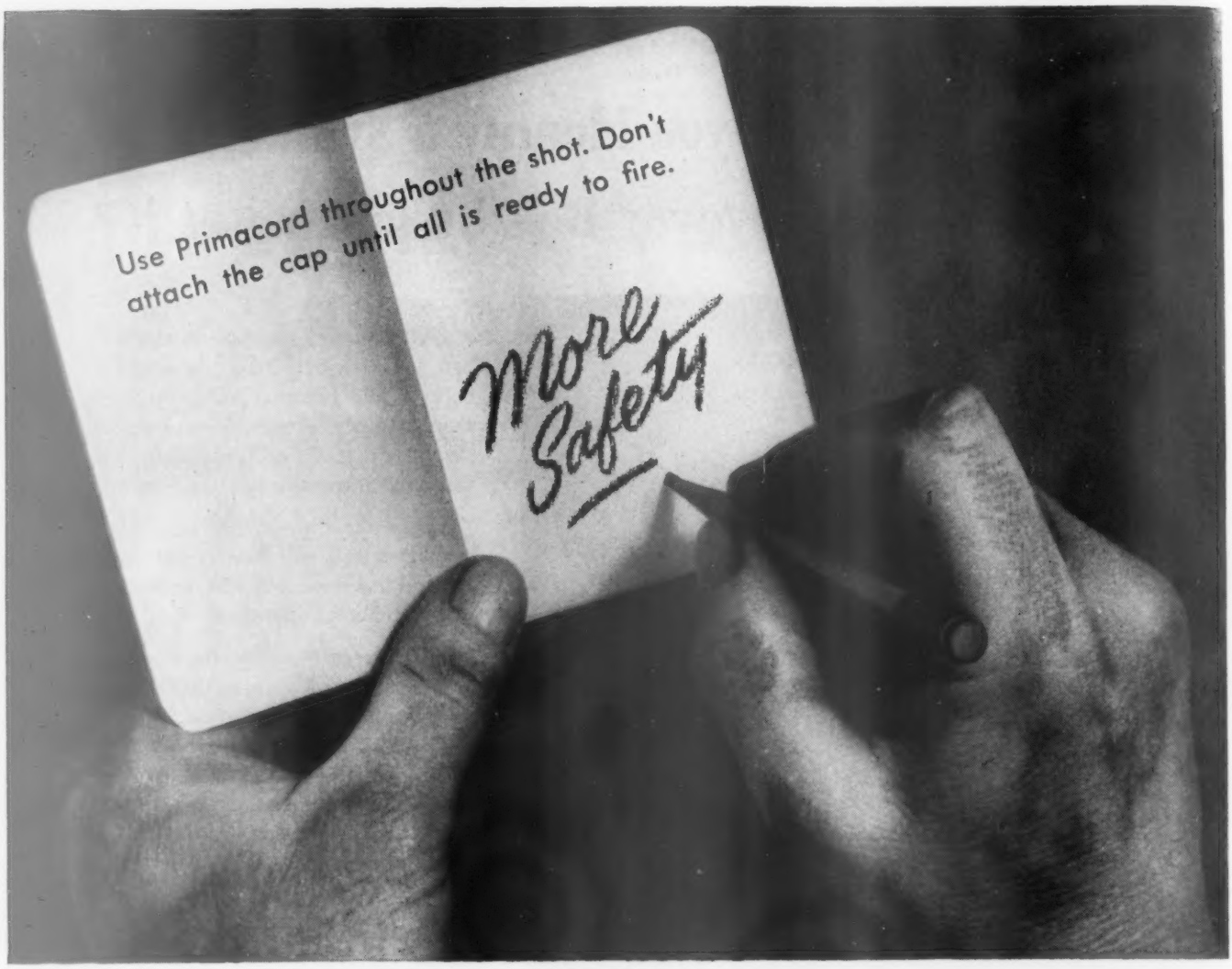


# *When all is ready to fire...*

# ATTACH THE CAP

Yes . . . the use of Primacord promotes safety in loading and firing because the only cap on the job is applied to the end of the Primacord Trunk line *after* all holes have been loaded and connected. Primacord itself is insensitive to fire, friction or ordinary shock, and is not affected by stray electric currents from high voltage lines or thunder storms.

Primacord consists of a powerful core of PETN within a waterproof textile cover. It is simple and easy to use. When detonated with a single blasting cap, the powerful detonating wave travels at the rate of 3.9 miles per second and detonates *every* cartridge in *every* hole. Send for the Primacord Book.

17

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***Detonating Fuse***

**Manufacturers of Safety Fuse since 1836**

**THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT**

Body with open or scoop end
(Right) Same body elevated.

# X-112 BODIES *and* T-4440 HOISTS *for* OPEN PIT MINING

Body with automatic
downfold tailgate.

Fleets of Trucks, equipped with Gar Wood X-112 Bodies and T-4440 Hydraulic Hoists, are hauling the biggest loads ever moved by trucks on production schedules. Lower mining costs have been made possible by speeding up the handling of overburden, ore and coal.

## SPECIFICATIONS

HOIST—Hydraulic, twin cylinder, telescopic.

PUMP—Gear type with aluminum wearplates.

POWER-TAKEOFF—2-gear single speed.

BODY—Heavy duty with pressed-steel, box-type side braces and cross members.

BODY SHELL—1/4" sheet steel with 2" wood filler.

WEARPLATE—1/4" with floor angles or 5/16" without. Longitudinals 8-inch "H" beams.

CAB SHIELD—1/4" plate.

FLOOR ANGLES—Optional.

Automatic gate
opens as body
elevates.

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**PORTABLE CONVEYORS**

*LEFT:* 60′ B-G Belt Conveyor mounted on swivel truck stockpiling from portable crushing plant in gravel pit.

**BUCKET LOADERS**

*CENTER:* B-G 552 Bucket Loader loading truck from processing plant stockpile. Feeding spirals give B-G Loader excavating ability and positive feeding of buckets.

**PERMANENT CONVEYORS**

Top photos show B-G Permanent Belt Conveyor used to supply aggregate to bin for batching to ready mix trucks. Raw aggregate is dumped into feeding hopper at right by trucks and B-G Conveyor elevates aggregate to bin.

44-23

# BARBER-GREENE

AURORA, ILL.

LET'S ALL BACK THE ATTACK 4th WAR LOAN

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*through*

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## HIGHER EFFICIENCY
## LOWER MAINTENANCE

THE cumulative effect of wartime operating conditions — *increased production demands, less opportunity for shut downs for inspection and repairs, shortage of supplies* all influence operating costs, plant output and equipment life. Maintain the production capacity, efficiency and lower maintenance expense of your Symons Cone Crusher by giving it the attention and care that should be given any piece of high grade machinery.

As an aid to users of Symons Cones, we have prepared a booklet on the proper care of their crushers. Every operator should have this booklet. It is complete with facts, data and suggestions gained from years of field studies and operation.

*Use the coupon when requesting your copy*

**NORDBERG MFG. CO., CRUSHER DIVISION**
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**Please send me without obligation the booklet: "Get The Most Out Of Your Symons Cone Crusher."**

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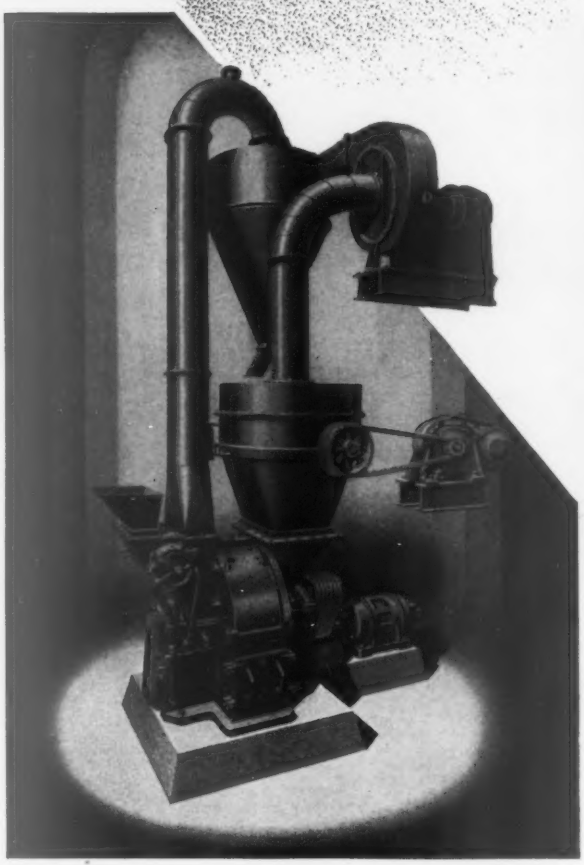
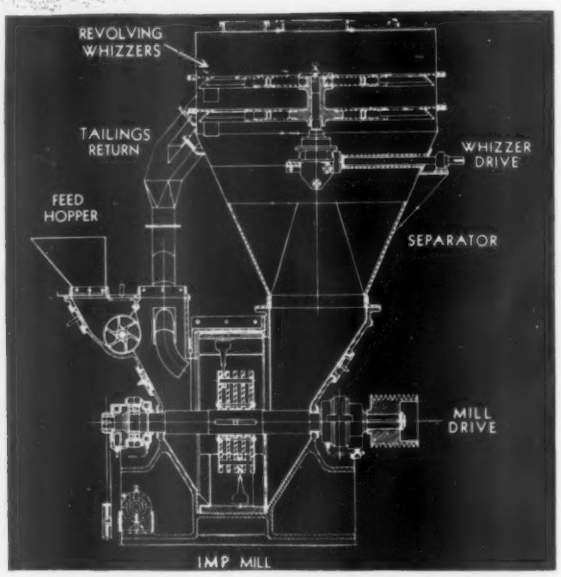
# SYMONS CONE CRUSHERS

# WIDE... FLEXIBILITY

## *in* — FINENESS CONTROL






*Section of Raymond IMP MILL showing double-whizzer separator built integral with the mill. Wide range fineness control by changing the speed of the revolving whizzer with variable speed unit.*

SINCE 1887

**The Raymond IMP MILL . . . with whizzer separator as shown . . . provides close product-control in making finely ground powdered materials. When equipped with a drying system, it is used for simultaneous drying and grinding operations. It will take partially dried washed kaolin, and finish the moisture removal, delivering a fine, dry, uniform product, testing 325-mesh. Also used for drying and disintegrating various clays . . . receiving the material with initial moisture of around 27% and delivering a product with below 5% residual moisture at a fineness of 99% or better through 300-mesh.**

**It has scores of other applications . . . and the standard Raymond IMP MILL in combination with the Mechanical Air Separator will handle many other materials, such as asbestos ore, pelletized burnt lime, rock salt, graphite, calcined gypsum, phosphate materials and similar products. If you need a simplified method of doing an unusual drying or grinding problem, write for Raymond Catalog No. 41.**

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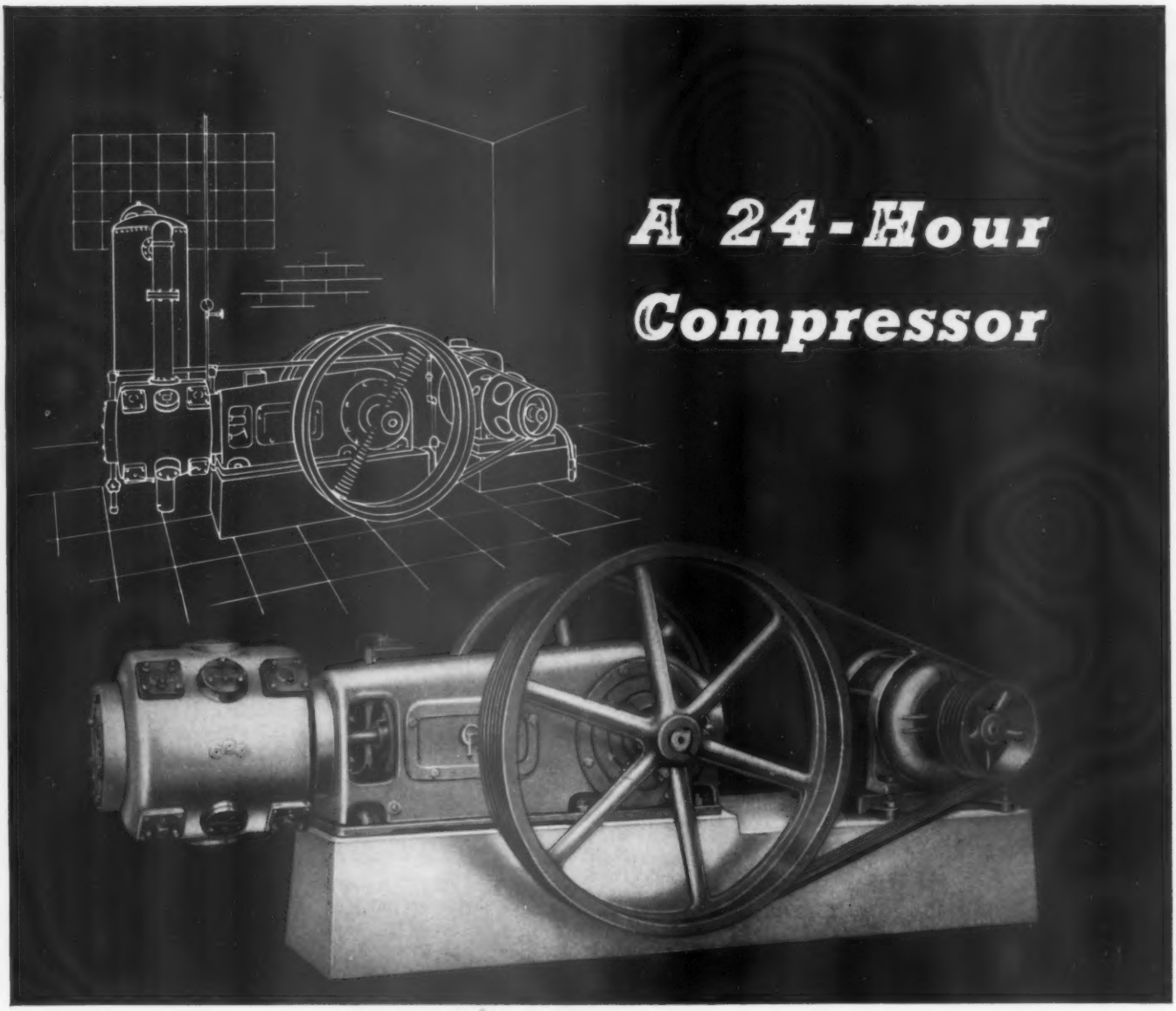


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THE CP Type T Compressor is a "wheel horse" for economical, continuous performance... keeps working away, year after year, with minimum maintenance. It is of the horizontal, single-stage, double-acting, water-cooled type, arranged for belt, direct-connected motor or steam drive. Simplate valves, liberal water jackets, one-piece trouble-free crosshead, double-row tapered roller main bearings are a few of the features responsible for its superior performance. Type T Compressors are available in sizes from 15 to 125 hp, in single-stage design for pressures up to 150 pounds, and in multi-stage units for pressures up to 5,000 pounds. Write for Bulletin 728.

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## for after the war when lower costs will count!

THE Mevac power control system—a Buckeye development—conserves the operator's energy. Operators can, and do, dig more yards of gravel day after day. Mevac is easier on clutches, brakes and engine—maintenance and fuel costs are less. Six small handles, responding to a feather touch, speed the Clipper smoothly through the digging routine. Mevac vacuum power control is only one of many exclusive but proved-in-service features of these sturdy 1/2 and 3/4 yard convertible shovels. They cut costs on stripping, digging gravel and stockpile rehandling. Send for a copy of "The Age of Clippers."

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Convertible Shovels Road Wideners Trenchers
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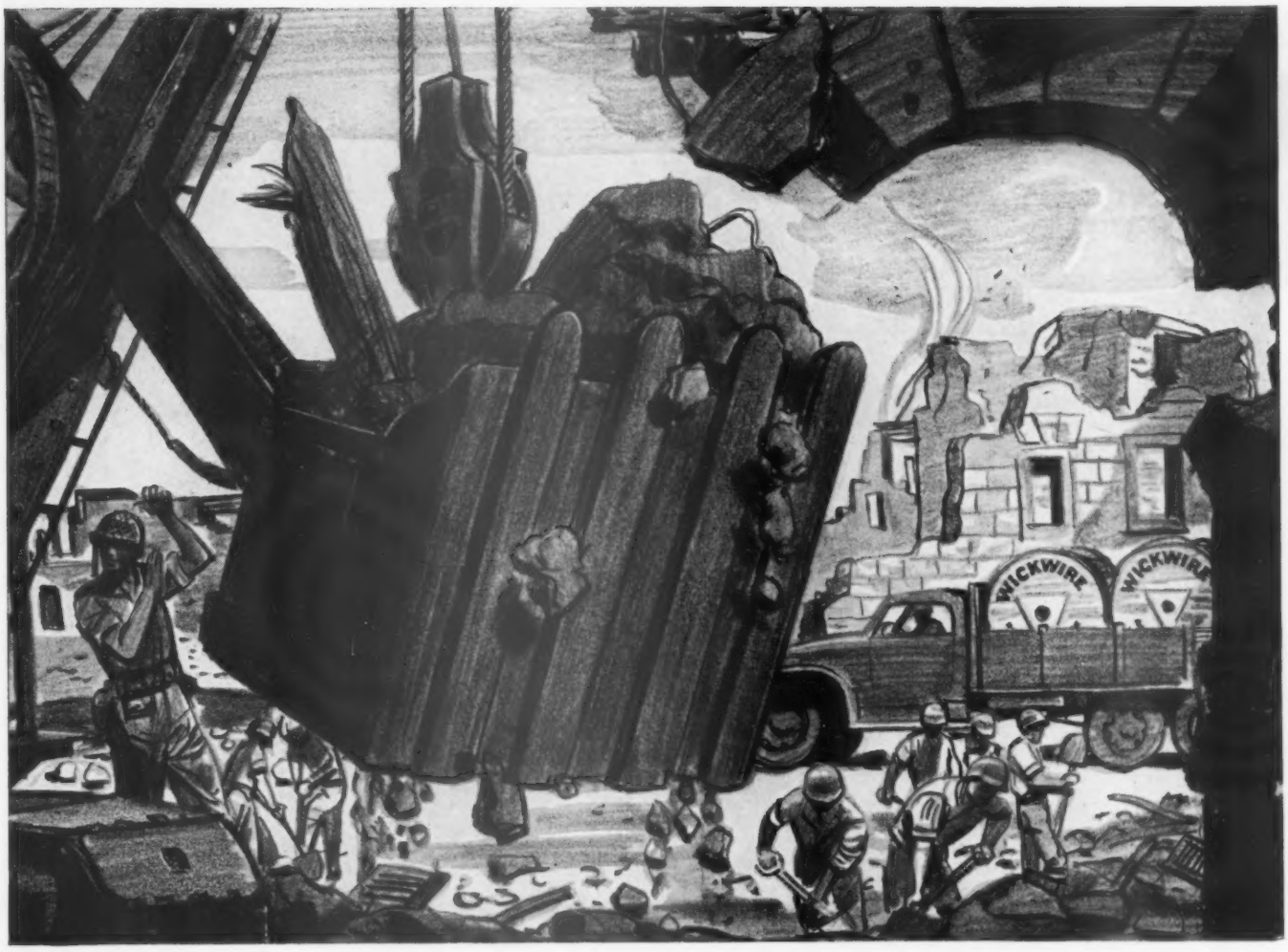


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We will be happy to help you with your wire rope problems and also to send you copies of "Know Your Ropes" which offers helpful advice on proper selection, application and usage. Write Wickwire Spencer Steel Co., 500 Fifth Avenue, New York 18, N. Y.

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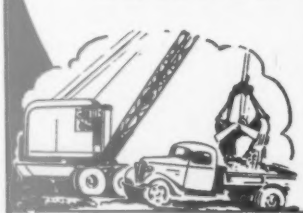
**WELDED ROLLED STEEL CONSTRUCTION is one big reason for LONGER BUCKET LIFE!**



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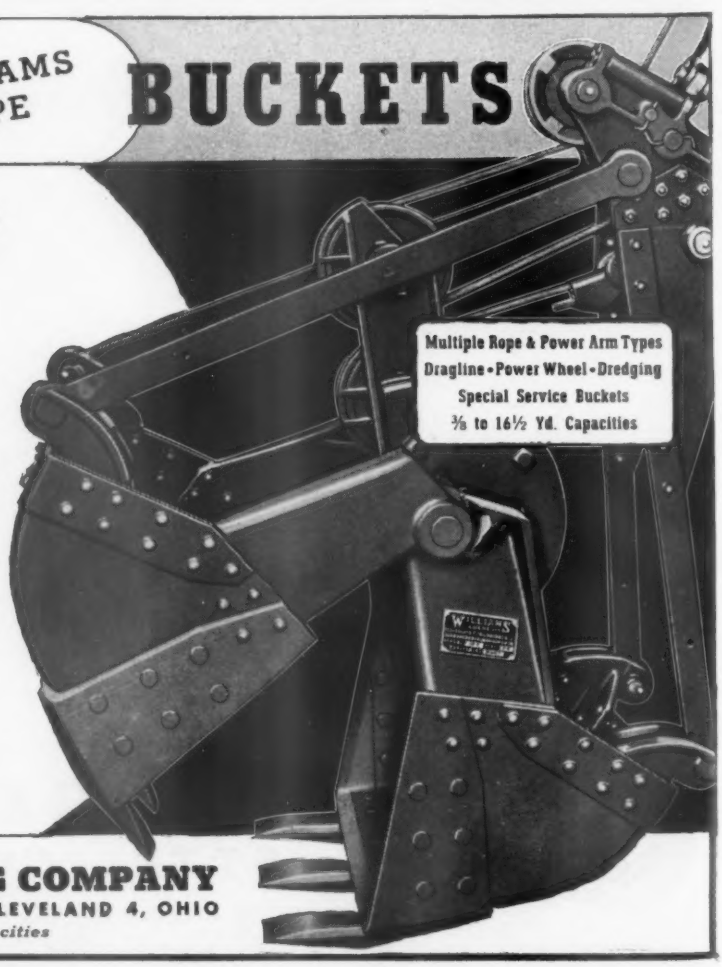


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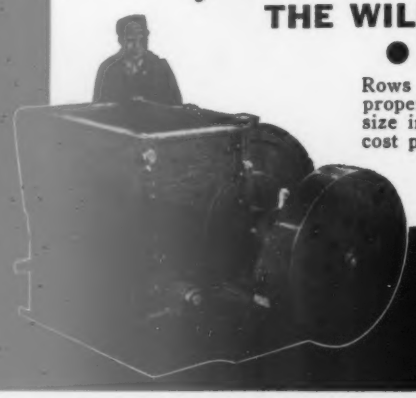
*for Making 1¼", ¾" or Agricultural Limestone...*

**THE WILLIAMS "SLUGGER" CRUSHER AND PULVERIZER**

**● Handles Large Stone or Screen Rejects ●**



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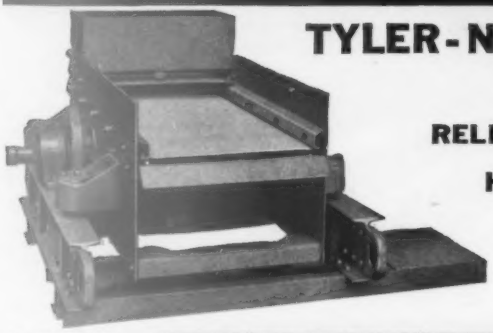


2' x 4' Type 100 Tyler-Niagara Screen

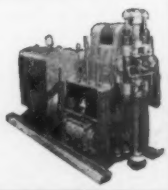
6' x 14' Type 900 Tyler-Niagara Screen

**THE W. S. TYLER COMPANY, Cleveland 14, Ohio**

# DIAMOND CORE DRILLING

*CONTRACTORS*

Fire Clays, Coal, Limestone
Gravel Deposits, All Minerals

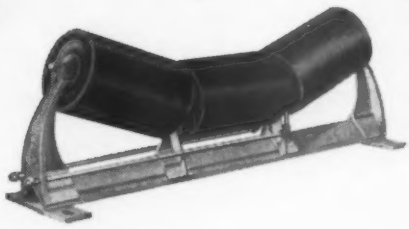


**MOTT**
**CORE DRILLING CO.**
HUNTINGTON, W. VA.

FOX
ROUND
SQUARE
SQUAROUND
HEXAGON
**PERFORATED**
**PLATE**
of every description
for maximum productive-ness from your vibrating screens.
*Reg. U. S. Pat. Off.

HENDRICK MANUFACTURING CO.
30 Dundaff Street, Carbondale, Pa.
*Sales Offices in Principal Cities. Please Consult Telephone Directory.*

# Continental
## BELT CONVEYORS AND ACCESSORIES



Continental Idlers are made in a complete range of sizes and types for any kind of service. Troughing or Return Rolls of either Cast Iron or Steel are made for belts 14" to 60" wide; Troughing Idlers in 5" and 6" diameter sizes; Return Rolls 4", 5" or 6" diameters. All Idlers are equipped with Anti-Friction Bearings.

Consult Continental on your Belt Conveyor problems. We will gladly assist you or make recommendations.

*Write for Bulletin ID-105-T*

TRIPPERS PULLEYS TAKE-UPS DRIVES CHUTES
SPOUTS HOLD-BACKS SCRAPERS

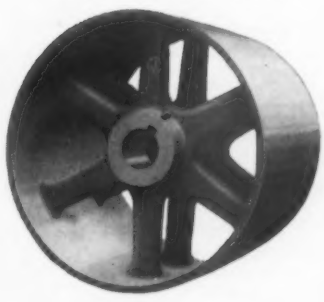
**INDUSTRIAL DIVISION**
**CONTINENTAL GIN COMPANY**
BIRMINGHAM, ALABAMA
ATLANTA • DALLAS • MEMPHIS

# High test cast iron pulleys in all sizes and types

Completely split pulley

Single arm solid pulley

Extra heavy conveyor pulley



Double arm pulley

JONES cast iron pulleys are true running — they permit higher speeds — no bushings and they can't fall apart — they don't rattle and they look better on most machines.

These pulleys are machine molded, poured of high test cast iron, and are accurately finished and balanced. Multiple piece pulleys, rubber covered pulleys and flywheels can be furnished.

**W. A. JONES FOUNDRY & MACHINE CO.**
**4441 Roosevelt Road, Chicago, Illinois**

# Jones

HERRINGBONE — WORM — SPUR — GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

# It's Aggregate IN THE BIN that Counts

**. . . and you can't beat a DIAMOND for putting it there!**

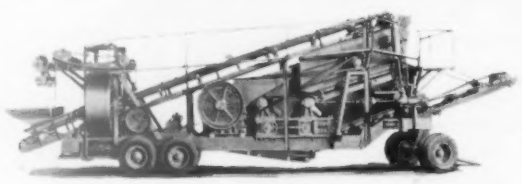
DIAMOND NO. 65 Portable Rotor-Lift Plant producing over 300 tons per hour of stabilized base on a Southwestern Airport job.

## High Output at Lower Cost Per Ton Because—

## NO BOTTLENECKS in a DIAMOND Plant

DIAMOND Portable Rotor-Lift Plants consistently turn out highest production of true-to-size aggregate because the whole plant is compact, not a foot of material travel is wasted—no by-passing—and every unit is of proper size for balanced cutput.

The main conveyor takes pit run material in a straight line through center of Rotor-Lift up to top deck of the vibrator. Crushed oversize is distributed EVENLY by the Rotor-Lift onto the main conveyor, preventing overloads on the screens or crushers. All units—vibrator, jaw crusher, roll crusher, conveyors—are rugged veterans proven by years of heavy duty service. It all adds up to smooth, uninterrupted production at low cost per ton—and at a profit for you! Ask for new Bulletin D-43-G, or see your DIAMOND Dealer.



**Made in many sizes and types:**

Quarry Plants—portable and stationary.
No. 36—Portable, rotor-lift.
No. 65—Portable, rotor-lift.
No. 95—Portable, rotor-lift.
Portable washing - screening plants.
Portable and stationary Crushers.
Vibrating, rotary and scalping Screens.
Conveyors, bins, feeders.

**DIAMOND IRON WORKS, INC.**
ESTABLISHED 1880
AND THE MAHR MANUFACTURING CO. DIVISION

1801 SECOND ST. N. MINNEAPOLIS 11, MINN.

# BLAW-KNOX BUCKETS

***take the least of your crane time—handle more pay load***

**Send for the catalog which describes the bucket you need—**

- No. 1853—Blaw-Knox Buckets for Cement, Chemical and Fertilizer Plants.
- No. 1696—Blaw-Knox Buckets for Single Drum Hoists for use on Railroads, Mills, Foundries, Etc.
- No. 1745—Blaw-Knox Buckets for "Burtoning" handling Nitrates, Grain, Potash, Etc.
- No. 1757—Blaw-Knox 2 Line Lever Arm Buckets for Rehandling, Barge Cleanup, General Purpose, Hard Digging, Dredging.
- No. 1865—Blaw-Knox 4 Rope Buckets for Coal, Ore and Cleanup.
- No. 1752—Blaw-Knox Buckets for Incinerator Service.

Installation of a Blaw-Knox Bucket at a "trouble-spot" takes that worry off your mind—definitely—for each bucket is tailor-made for its particular job.

For digging and rehandling the many bulk materials throughout industry there's a Blaw-Knox Bucket.

You can select a bucket from the many interesting catalogs listed above.

**BLAW-KNOX DIVISION of Blaw-Knox Co.**
2068 FARMERS BANK BUILDING, PITTSBURGH, PA.
NEW YORK · CHICAGO · PHILADELPHIA · BIRMINGHAM · WASHINGTON

# *Flink* Spreads Wet or Dry Lime Faster — at Lower Cost —

There is no other lime spreader on the market comparable to the Flink. Designed strictly for the commercial spreader. No helper is required on the back as the Flink is operated by the driver of the truck.

Does not limit use of truck. Fits on end like tail gate.

Spreads evenly wet or dry material up to 1" in size, up to 28 ft. in width. Built for hard use. Time tested. Hundreds in use throughout America. Write for complete literature.

*The* **FLINK CO.** Streator Illinois

*For particulars write our nearest representative:*

WICO SALES, 2924 N. Western Avenue, Chicago 18, Illinois
G. W. CLEMENTS, 3050 Fremont St., Columbus 4, Ohio
TULSA MACHINERY CO., Tulsa, Oklahoma
NORTHLAND DELUXE EQUIPMENT CO., Janesville, Wisconsin
WISCONSIN OIL & EQUIPMENT CO., 34 Park Ave., Oshkosh, Wis.
C. R. HANSON, 2303 Grand Ave., Kansas City, Missouri
H. C. JORDAN, Irvington, Kentucky

**GRUENDLER CRAFTSMANSHIP**

*Serving Industry over 50 Years*

## Crushing at Peak Production

**150 to 200 tons of crushed rock per hour**

**Steam Shovel sizes to 5″ to 6″ minus in one-operation**

These heavy plate and cast steel constructed roller bearing JAW CRUSHERS have tremendous crushing power. Built to take it for continuous operation with minimum maintenance.

The Weight of above 25 x 42 JAW CRUSHER is 54,200 lbs.

*Mfgrs. of Double Roll Crushers and Hammer Crushers for Secondary Crushing requirements.*

BULLETINS MAILED ON REQUEST

# GRUENDLER

**CRUSHER and PULVERIZER CO.**

2915-17 North Market St., ST. LOUIS (6), MO.

**JAEGER "FLEET FOOT" CRANE-LOADER**

Can travel 12 m.p.h., turn in 10½ ft., climb any ramp—hoists faster than 1 ft. per second and swings 12-18 ft. boom 90° to either side without outriggers for loading and accurately placing up to 10,000 lbs. Nimble, powerful, safe (no load ever over operator). Tier loader attachment if desired. Send for Specification CL-44.

**THE JAEGER MACHINE CO.** 602 DUBLIN AVENUE COLUMBUS 16, OHIO

Hoists, Winches, Air Compressors, Truck Mixers, Mixers, Centrifugal Pumps



## Looking for Used Equipment?

Refer to the listings in the Broadcast Section in this issue for a wide variety of used and surplus machinery and supplies.

## Stands the Gaff!

—now being made with AR-POLENE, the American synthetic rubber—

## LIGHTNING *Ribbed Center* Conveyor Belt

—can take it! It overcomes both steep inclines and wet materials. It has yet to meet a moisture problem it could not solve, and carries more yardage per dollar of cost than any other belt.

**The Ribbed Center**
—keeps the load from slipping, even on the sharpest inclines.

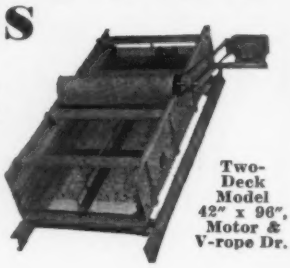
For tough conveying jobs, see what this belt can do.

*The*
**AMERICAN RUBBER**
***Manufacturing Company***
Factory and General Offices:
Park Ave. & Watts St.,
Oakland 7, Calif.

# UNIVERSAL SCREENS

GUARANTEED to give you best results on your most difficult separations.

RUGGED - SIMPLE Construction. LOWEST in FIRST cost and MAINTENANCE cost.



Two-Deck Model 42" x 96", Motor & V-rope Dr.

Catalog No. 107,—32 pages on Screens and Screening is yours for the asking.

**UNIVERSAL VIBRATING SCREEN CO.**

RACINE - - WISCONSIN

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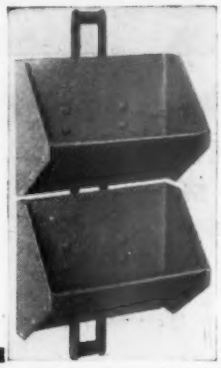
# COLUMBUS...a Plant or a Bucket

COMPLETE CONCRETE CONSTRUCTION SERVICE

"Large or small, we handle 'em all"—every order for COLUMBUS Equipment gets *action*. Concrete, cement, crushed stone, and sand and gravel producers rely on COLUMBUS for *better*-performing machines.

*Write for Catalog 55*



**THE COLUMBUS CONVEYOR COMPANY**

**Columbus 8, Ohio**

Some territory open for responsible representatives

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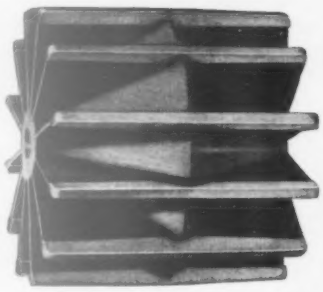
*GIVE your elevator and conveyor belts a chance for longer productive life.*



*GET more trouble free productive hours from your equipment.*

*SAVE one-fourth to one-third of replacement expense.*

*INSTALL S-W Wing Type Boot and Tail Pulleys. The exclusive wing and cone feature permits the escape of entrapped materials and reduces abrasive action and friction between pulley face and belt.*

Write for Bulletin 3001 for detailed information.

**SPROUT, WALDRON & COMPANY**

136 SHERMAN STREET, MUNCY, PA.

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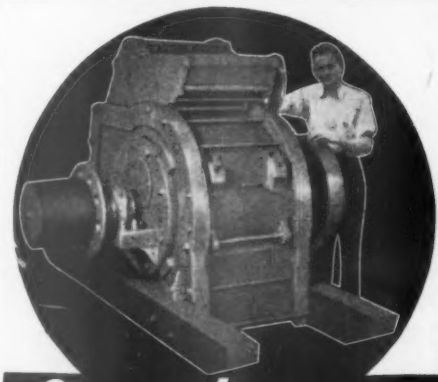

# You can do more in a "DAY"

**SWING HAMMER PULVERIZER**

Its wide crushing range makes it serve the purpose of two or more other types of crushers. Roller bearing equipped. Write for Bulletin.

**Brooks** EQUIPMENT & MFG. CO. KNOXVILLE, TENNESSEE

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# DENVER HYDROCLASSIFIERS

***for fine sizing***

and desliming problems, this machine has proved very efficient both in metallurgical results and in mechanical operation. Enclosed lifting device and spiral rakes are distinctive advantages. It will do the work of any hydroseparator Write for new Bulletin No. C4A-B

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CHICAGO: Suite 1005, 69 W. Washington St. MIDDLESEX, ENG.: 493A, Northolt Rd. S. Harrow
SALT LAKE CITY, UTAH: 737 McIntyre Bldg. RICHMOND, AUSTRALIA: 130 Victoria Street
TORONTO, ONTARIO: 45 Richmond St. W. JOHANNESBURG, S. AFRICA: 4 Village Road

**DENVER EQUIPMENT COMPANY, 1400 17th St., Denver, Colorado**

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# SIMPLICITY

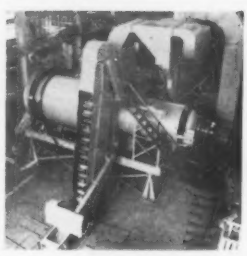
**ASPHALT PLANTS and INDUSTRIAL DRYERS**

combine the best in

DESIGN
MATERIALS
WORKMANSHIP
CAPACITY
PORTABILITY
ECONOMY

to insure complete

**DEPENDABILITY**



*Write for Bulletin.*

**THE SIMPLICITY SYSTEM CO.**

Chattanooga, Tennessee

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# B&W CASTINGS

**ELVERITE**, for wear resistance

**ADAMANTINE**, for abrasion-resistance, great strength and machinability

**HEAT-RESISTANT CASTINGS**

C45

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET . . . NEW YORK, N. Y.

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# MAKES TOUGH JOBS EASY

**Loads SAND, COAL, EARTH and other bulk materials . . . does the work of many men.**

*Available for* **INTERNATIONAL** MODELS I-4, I-6 and ID-6

OTTAWA HYDRAULIC FRONT END LOADER lifts loads of one-half yard to a height of 8 feet . . . will load two loads a minute. Shovel unit quickly attached or detached without altering tractor . . . bucket automatically stops in highest position . . . provides perfect visibility for operator.

Export Office 713A Linwood Blvd. KANSAS CITY, MO. Cable Address "MIDCO"

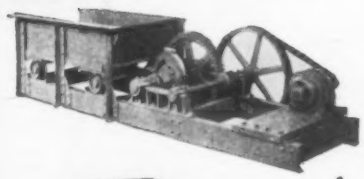
● Prompt delivery . . . write for full information and prices TODAY

**Ottawa STEEL PRODUCTS, Inc.**

OTTAWA, KANSAS · U. S. A.

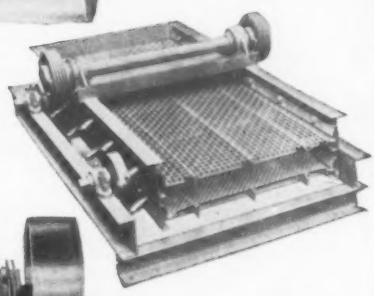
# McLANAHAN EQUIPMENT *for*

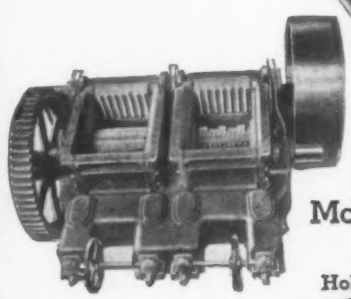
- STONE
- SAND
- GRAVEL



Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.



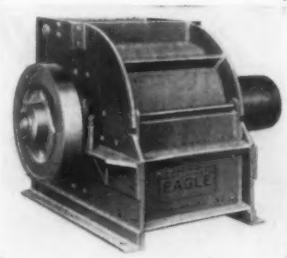


Let McLANAHAN & STONE solve your operating problems.

McLanahan & Stone Corporation
Established 1835
Hollidaysburg, Pennsylvania

# EAGLE LIMESTONE PULVERIZER and IMPACT BREAKER

# MAKES PROFITS In Agstone *from* Quarry Waste




**DON'T THROW IT AWAY!** . . . .

. . . undersized rock material and dust can be processed by the EAGLE Pulverizer to supply needed agricultural limestone—a clear profit!

This EAGLE unit is widely used as a double-purpose crusher, as it is adjustable to furnish construction and road stone.

Available in several sizes. Extremely economical in first cost, power needs, and maintenance.

*Write for Bulletins*

EAGLE
JAW CRUSHERS
IMPACT BREAKERS
PULVERIZERS
CONVEYORS
LOADERS

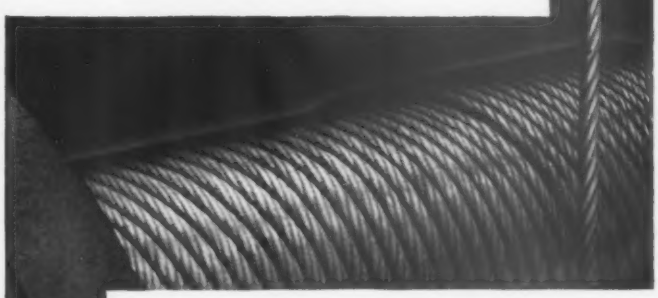
Territory open for responsible distributors

EAGLE CRUSHER CO., INC., Galion, Ohio

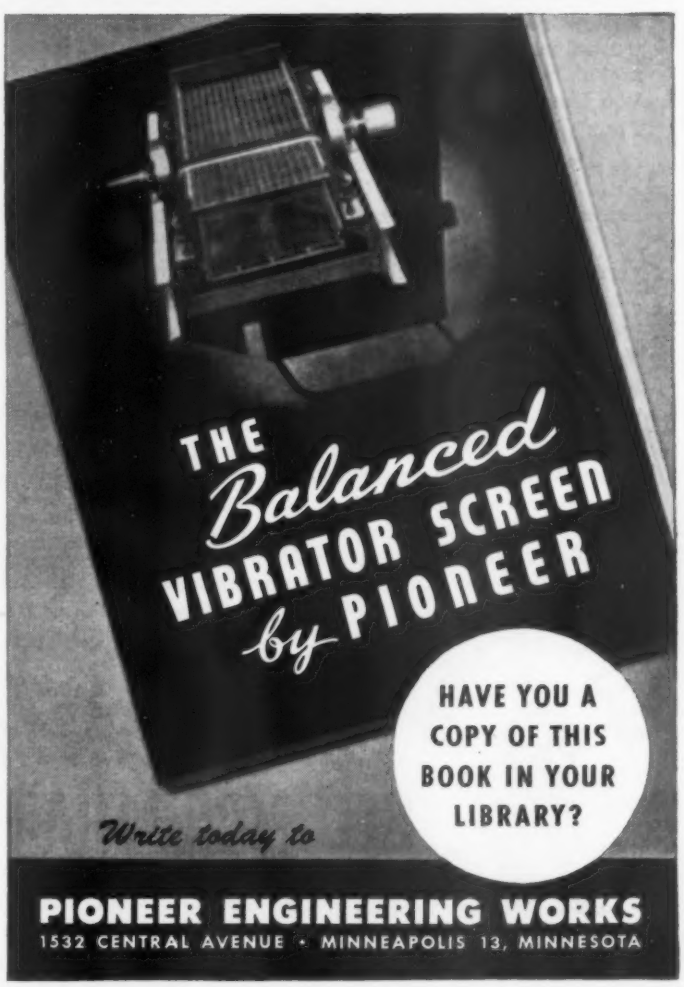
# Keep your WIRE ROPE in good condition —on the job for the duration

J&L STEEL

Wire rope is at war on all fronts—home front, production front, shipping front, battle front. Make every length of wire rope now in service last . . . by care . . . extra care . . . unceasing care. Use facilities and services of your source of supply for helping you care for your wire rope . . . get maximum ton-miles of service for seeing you through to victory.



JONES & LAUGHLIN STEEL CORPORATION
WIRE ROPE DIVISION
PITTSBURGH, PENNSYLVANIA




PIONEER ENGINEERING WORKS
1532 CENTRAL AVENUE • MINNEAPOLIS 13, MINNESOTA

# Just in case you've eased up... ON YOUR PAY ROLL PLAN

Pause one brief moment. Compare your lot—and that of the men and women in your employ—with the lot of the infantrymen who meet the enemy face to face, who do the hardest fighting, who suffer the most casualties.

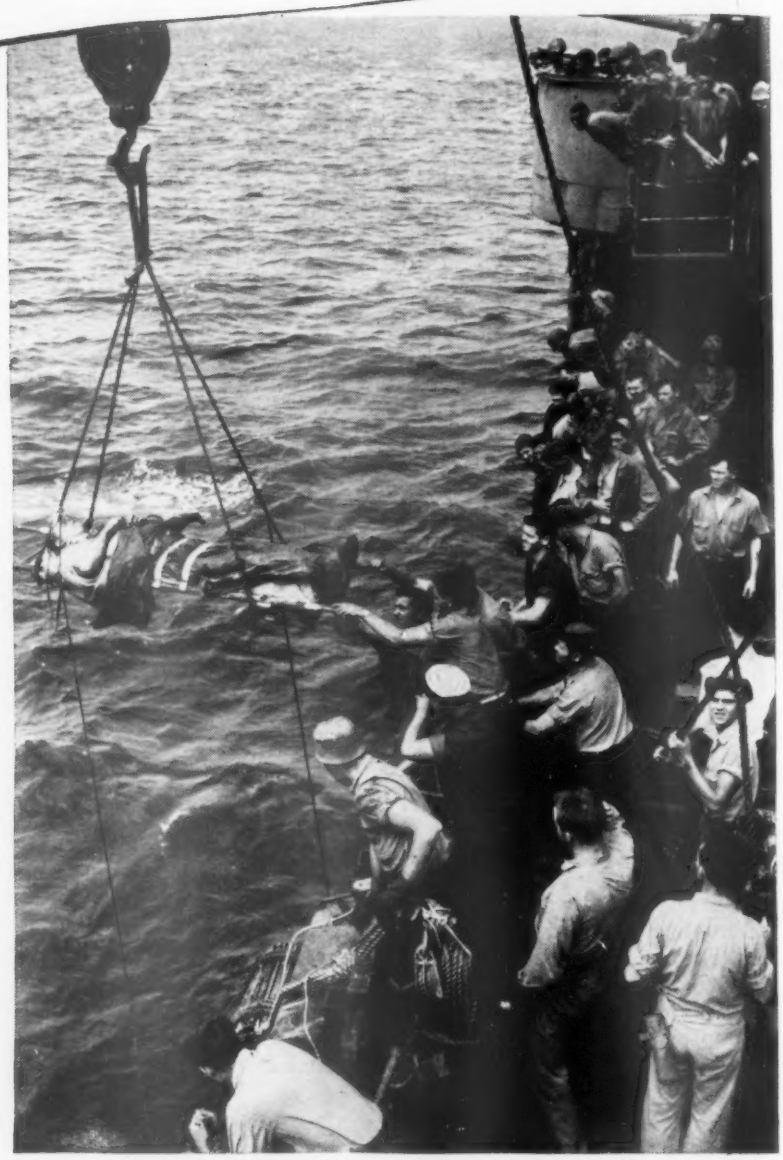
Let the full impact of war's unending grimness swiftly convert any tendency toward complacency into revitalized urgency. Remember—the war is not yet won.

As top management and labor, you've been entrusted with two major responsibilities—steadily maintained production, and steadily maintained War Bond Sales *through your Pay Roll Savings Plan.*

Decide *now* to revitalize your plant's Pay Roll Plan. Have your Bond Committee recheck all employee lists for percentages of participation and individual deductions. Have Team Captains personally contact each old *and new* employee. Raise all percentage figures wherever possible.

Don't underestimate the importance of this task. This marginal group represents *a potential sales increase of 25% to 30% on all Pay Roll Plans!*

Your success will be twofold: A new high in War Bond Sales; and a new high in production. Because a worker with a systematic savings plan has his mind on his work—not on post-war financial worries. He's taking care of the future now. His own. And his Country's future. *Help him!* REVITALIZE YOUR WAR BOND PAY ROLL SAVINGS PLAN.



Official U. S. Coast Guard Photo: The elevator to a Coast Guard-operated transport hospital

## Back the Attack!
## SELL MORE THAN BEFORE!

*The Treasury Department acknowledges with appreciation the publication of this message by*

*Pit and Quarry*

*This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council.*

### Miscellaneous

Sauerman 50 hp. electric dragline hoist
National 25 hp. electric double drum hoist
Lidgerwood 15 hp. electric single drum hoist
Electric motors: 1—100 hp. with starters
Chicago air compressor, NSB, 529CFM
Schramm air compressor with 60 hp. motor, 360CFM
I-R gasoline powered air compressor on skids
Worthington 4" centr. pump with 25 hp. motor
Morris 6F manganese lined sand pump
Ellicott 4" belt driven sand pump
Vertical centr. 20 hp. electric 6" water pump
Whitcomb 36" gauge 8 ton gasoline locomotive
Flat cars, 24" and 20" gauge
400 hp. V-belt-drive pulley unit
Enclosed 25 hp. angle drives with roller bearings
Blueprinting machine, model A, Shaw

### Crushers, Rolls and Mills

Acme 6"x21" type C jaw crusher, roller bearings
Acme 18"x32" jaw crusher
Buchanan Blake type jaw crusher, 10"x16"
New England 11"x20" jaw crusher
Champion 12"x24" jaw crusher
Scholl 9"x16" jaw crusher
Reliance 8"x14" jaw crusher
Traylor "BULLDOG" 11" gyratory crusher
Robins double roll 24"x30" coal crusher
Single roll 24"x24" coal crusher
Simplex coal pulverizer, roller bearings
Sturtevant Rotary Fine crusher No. 0
Williams No. 2 hammermill
Mid-West No. 2 hammermill

### Bucket Elevators

Enclosed 10", 12", 16" bucket elevators to 100'
Enclosed 6' bucket elevator, 36" centers
Open 16" bucket chain elevator, 50'
Open 18" bucket belt elevator, 40'
Open new 20" bucket 9 ply belt elevator, 52'
Continuous 30" bucket belt elevator, 35'
New 9 ply 22" elevator belt, ¼" and ⅛" cover.
Used 6 ply 20" elevator belt
Gears, sprockets, take-up bearings and chain
Link-Belt chain elevator for barrels

### Conveyors

36"x100' trough belt conveyor
New 4 ply conveyor belt, 20", 24", 30"
Selected belt conveyor parts
Belt conveyor pulleys, 150 with shafts
Steel belt conveyor, 23"x96'
L-B SINGLE Strand Flight conveyor, 15"x56'
Jeffrey Foundry mold conveyor, 42"x150'
Jeffrey 24" Standard Steel Apron Feeder
Belt trippers from 14" to 30" wide
Screw conveyors, 6", 9", 12", 16"

### Screens, Washers

Two Hummer single deck 3'x5' vibrating screens
1 Hummer single deck 4'x5' vibrating screen
Tyler 15 cycle generators for Hummer screens
Jigger 3 deck 2'x5' vibrating screens (2)
Revolving screens: 5'x20' and 42"x18'
Allen Cone sand tank

### Stone Working Equipment

2 Meyers stone saws, 60" and 48" dia. late types
2 Lincoln 12"x12' open side planers, electric
1 Lincoln 12"x12' open side planer, electric
1 Patch 36"x12' belt driven open side planer
2500 lbs. of new and used steel tools for planers.

**G. A. UNVERZAGT & SONS**
136 Coit St., Irvington, N. J.

---

### SHOVELS—CRANES

Link-Belt K2 Caterpillar Crane, 55" bm.
P & H 650, 1¼ yd. Shovel-Crane, gas
Keystone Model 18 Backhoe Trencher, gas
Lorain 75B, 1½ yd. Shovel, gas. Rebuilt
Lorain 75A, 1¼ yd. Shovel, gas
Buc.-Erie 50B, 2 yd. Stripping Shovel, steam
Moore Speedcrane 15 tons, gas, 65' boom
Bucyrus Erie Model 1030 Electric Tunnel Shovel
Koehring 301 Shovel & Crane, ¾ yd.
Northwest No. 3 Crane, Shovel & Backhoe
P & H Model 600 Shovel, gas
Marion 37, 1¾ yard Steam Shovel
Lorain Model 45 Crane-Shovel
Ohio Diesel Locomotive Crane 22½ tons

### SPECIALS!!

Allis-Chalmers cent. pump, electric, 3500 GPM, 50'
Worthington 8" cent. bronze impeller, elec. Pump
Rotary Screen 4'x18' with Bucket Elevator 40'

### BUCKETS—STONE SKIPS

⅞ yd. Blaw-Knox Clamshell, digging
⅞ yd. Hayward Clamshell, digging
Hayward ¾ yd. Standard Orange Peel
⅝ yd. Williams Clamshell, digging
⅝ yd. Haiss Clamshell, digging
½ yard Haiss Clamshell, rehandling
¾ yard Haiss Clamshell, rehandling
Erie ¾ yd. Clamshell, rehandling
Owen Stone Grapple

### TRACTORS—BULLDOZERS

Allis Chalmers K with bulldozer
Int. T35 with angledozer
TD 40 Tractor with bulldozer
Int. TD35 with bulldozer
Int. TD14 with bulldozer, rebuilt
Allis Chalmers L Tractor with Baker bulldozer

### CRUSHERS—CRUSHER PLANTS

Gyratory Crushers: K.V.S. 30, 37-S, 49; Traylor 8"; McCully 13", 8", 6"
Jaw: 10x22, 10x24, 11x18, 12x24", 14x24", 16x32
Complete Rock Crushing Sand & Gravel Plants

### LOCOMOTIVES—CARS

American 60 ton, steam, std. ga.
American 45 ton, Saddle Tank
Plymouth 45 ton, Diesel, std. gauge
Vulcan 30 ton Steam, Saddle Tank
Vulcan 20 ton, gas, std. gauge
Whitcomb 14 ton, Diesel, 36" gauge
Porter 13 ton, Steam Saddle Tank, 36" gauge
Davenport, 10 ton, std. gauge locomotive
Baldwin Westinghouse 8 ton, 36" ga. Battery
Vulcan 8 ton std. gauge, gas
Vulcan 6 ton, 36" gauge, gas
3—Western Steel 20 yard Air Dump Cars
3—30 ton Standard Gauge Flat Cars, rebuilt

### CONCRETE PLANT & EQUIPMENT

2—Ransome 28S Mixers on skids, left and right hand
Koehring 34E Dual Drum Power
Heltzel 85 ton, 3 compt. Steel Bin, weigh batcher
Blaw-Knox 100 ton, 3 compt. Aggregate Bin with 300 bbl. Bulk Cement Bin, with electrical interlocking

**RICHARD P. WALSH COMPANY**
30 Church St. New York, N. Y.

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1. 526 CFM Ingersoll-Rand, Style "J"
1. 940 CFM Ingersoll-Rand 10 horiz. 2-st. steam-driven, with receiver.

### COMPRESSORS (Portable)

1. 160 CFM Ing. Rand, Waukesha gasoline pneumatic wheel
1. 210 CFM Ing. Rand, Waukesha gasoline steel wheel
1. 315 CFM Ing. Rand, Waukesha gasoline steel wheel
1. 315 CFM Ing. Rand-Heisselman Diesel pneumatic wheel
2. 500 CFM Ing. Rand-Heisselman Diesel steel wheel

### CRUSHERS

24"x54" Superior Crushing Rolls
No. 3 and No. 6 McCully Gyratory

### MISCELLANEOUS

48" Cat. Elevating Grader, 25' carriage, pneu.-tired, diesel-operated
No. 511 Adams Motor Patrol with scarifier 12' blade, diesel-operated
No. 99 Austin Western Motor Patrol, 12' blade, all wheel drive, gas-operated
No. 2 Fairbanks Morse Wagon Drills

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No. 2 Koehring 3-way comb. crane, dragline & shovel
320-B Bucyrus Stripping, 6½-yd.
4-yd. Marion Shovel, 34' boom, 23'4" dipper handle, 4 cu. yd. manganese steel dipper
175-B Electric Revolving Shovel, 7 cu. yd. dipper, 65' boom

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60,000 gallon Water Tank on 98'9" tower with 10" riser pipe

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7, 7 cu. yd. Allis Chalmers Speed-Ace (Write for illustrated bulletin!)

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5, Super C Model 15 FDT Euclids, bottom dump with Cummins Diesel Engines
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**IRON & STEEL PRODUCTS, INC**
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*"Anything containing IRON or STEEL"*

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Koehring 501, 1¼ Yard Shovel Crane
P. & H. 600, 1 Yard Dragline Crane
Hanson ½ Yard Crane Dragline
O. & S. ¾ Yard Crane with generator and magnet
Insley Type "C" Shovel
New Holland 16x24 Roll Crusher
Ingersoll Rand 315 Diesel Compressor
Jaeger 7-S Mixer pneumatic tires
Novo 35 H. P. Single Drum Hoist
Sauerman 2 Yard Slackline with electric hoist
Telsmith #36 Gyrasphere Crusher
Caterpillar 40 Diesel Bulldozer
Pioneer 9x36 Jaw Crusher A. F. Bearings
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## 150-200 Ton Agricultural Lime Plant

#4 Austin Crusher
18 x 24 Hammermill
Motors, Elevators,
New 15 ton Truck Scales
Drills, Compressor, etc.
All Good condition and ready to run. Priced to Sell.

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1—19S Kennedy Reduction Crusher.

**C. E. & S. CORPORATION**
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# CONVEYOR BELTING

14"—18"—20"—24"—30"

DRIVE BELTS
10" & 12"

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Rubber Tired and Steel Wheels
Write for Illustrated Price List

**5—24 HP WAUKESHA POWER UNITS**

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**ELECTRIC MOTORS AC & DC**
1 to 100 HP Reconditioned and Guaranteed

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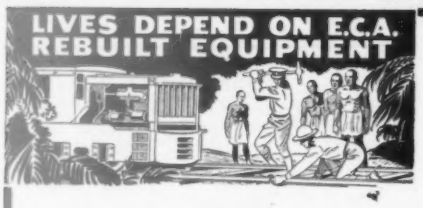


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**LOCOMOTIVE CRANES**

**4—25 Ton Loco. Cranes, Browning & Industrial, oil fired, 40', 45' & 50' booms.**

**1—15 ton Bucyrus Erie, coal fired, 40' boom.**

**AIR COMPRESSORS**

Portable and stationary, belt with elec., or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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40—Various sizes, clamshell, dragline, dragscraper, orange peel. All makes.

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1—¾ yd. Conco crane, Serial No. 1304, fully revolving, power 70 H.P. Continental gas engine, 30' boom.
1—¾ yd. Koehring crane, Model 301, with 45' boom, Serial No. 772. Gasoline powered.
1—¾ yd. P. & H Model 400 crawler crane, Serial No. 4136, with 40' boom gasoline powered.
1—½ yd. P. & H. shovel, Model No. 204, Serial No. 2303, gasoline powered.
1—½ yd. Northwest No. 2, Serial No. 2908, comb. crane and shovel.
1—¾ yd. Erie Model B2 crawler crane, steam powered. Serial No. 4027, with 50' boom and shovel attachment.

**CRUSHERS**

1—9x12" Rogers jaw crusher (like new).
1—No. 4 Champion jaw crusher, size 9x15", Serial No. 2606.
1—No. 2 Climax jaw crusher, size 9x16".
1—Buchanan jaw crusher, size 10x16".
1—Acme jaw crusher, Ser. No. 1873, size 12x20".
1—Acme jaw crusher, Ser. No. 1686, size 9x16".
1—United Iron Works "Blake-type" jaw crusher, size 9½x24".
1—10x12" Colorado Iron Works roll crusher. Laboratory type.
1—Allis Chalmers, No. 5 gyratory crusher, Ser. No. 5331, opening 10x38".
1—Austin No. 5 gyratory crusher, Ser. No. 2945, opening 12x35½".

**DERRICKS**

3—Steel Guy Derricks; 1—20 ton American steel derrick, 110' mast; 100' boom; 1—5 ton Terry Guy Derrick, 70' mast. 60' boom; 1—5 ton Insley, 75' mast. 80' boom. Stiff leg derricks; 1—25 ton Hunter, 40' mast, 80' boom; 1—2 ton Pittsburgh, 26' boom, 15' mast. Also a number of wood stiff leg derricks, 1 to 5 ton cap.

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85—Electric, ranging from 20 H.P. up to 125 H.P., consisting of triple-drum, double-drum and single-drum, with AC or DC motors, some with attached swingers. Following makes: American, Clyde, Lambert, Lidgerwood and National.
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Steam, ranging from 8 H.P. to 60 H.P., single, double and triple-drum; all standard makes.

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1—10" Morris sand pump, Ser. No. 86864, cap. 87 cu. yds. per hr.
1—8" Cataract dredging pump, Ser. No. 175895, cap. 2000 GPM @ 53' head.
1—8" Morris cent. sand pump, cap. 60 cu. yds. per hr.

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A large quantity of Jack hammer drills, column tripod and derrick drills.

**PARTIAL LIST ONLY — SEND FOR 48 PAGE STOCK LIST**

**All this equipment is owned by us and may be inspected at one of our plants. WE BUY—REBUILD, SELL AND RENT.**

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**EQUIPMENT CORPORATION of AMERICA**

## SPECIAL BARGAINS

Northwest crawler gas crane, 40' boom, full revolving, double drums, enclosed steel cab, overhauled in our own shop, ready for work, ¾ to 1 yard capacity.

Barber-Greene model 42 crawler gas disc type bucket loader overhauled by our men.

Bucyrus 20-B crawler gas crane, 40' boom, capacity ¾ yard.

Orton crawler gas full revolving crane, 30' boom, ½ yard bucket.

10 ton Buffalo Springfield 3 wheel gas roller.

**THE ACME EQUIPMENT COMPANY**
**14057 Schaefer Highway**
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## LIQUIDATION SALE:

Liquidating Red Granite Quarry at Lohrville, Wisconsin; 5 guy Derricks, 3 Gyratory crushers, 1 Symons horizontal disc crusher, 2 electric hoists, grout cars, and numerous other items; 2—75 HP motors, 1 Allis-Chalmers revolving screen, 1—11,000 gallon oil tank; rail, pipe and air receivers; complete inventory on request.

Write to

**KLATZKY BROS.**

**CALUMET** **MICHIGAN**

Due to the death of the manager while in the Armed Forces, the following is offered for sale:
1 Model B-2 Erie Steam Crane, 35' Dragline line Boom
1 Model B Erie Steam Shovel
1 # 40 Lorain Crane, Diesel, with ¾ yd. dragline and Clamshell Buckets
1 Barber Greene 55' Portable Conveyor, 24" belt, electric motor driven
1 Generating Plant consisting of 100 H.P. Diesel Motor, 67 H.P. Synchronous Motor, Direct current Generator, Control Switches, 9'x12' frame building on skids
1 Dredge Pump, 10" intake, 10" discharge, complete with flexible hose, couplings, pulley. On skids
1 Simplicity Gyrating Screen, three screens 3'x8'
1 Simplicity Gyrating Screen, three screens 3'x12'
1 Storage Bin
1 9x16 Cedar Rapids Crusher with three extra toggle plates
1 White Truck, 4 yd. Heil Hydraulic Dump
600 ft. 8" Wrought Pipe and couplings
1 Domestic Hoist, complete with ⅝" Cable

**Ferryview Sand & Gravel Co.**
**Rochester, Michigan**

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1—Lima 80 ton, 6 wheel Switcher with piston valve, with tender, superheater, code boiler, 200 lbs. pressure, electric lights, Walschaert valve motion, automatic lubrication; thoroughly modern, excellent condition, immediate delivery. For sale or rent.

1—Plymouth, 10 ton, gasoline Locomotive, standard gauge, MCB couplers, air brakes, etc.

## LOG TYPE STONE WASHER

1—Allis Chalmers 25 ft., heavy duty, Hutch type, Log Washer, with steel tank, ⅜" plate, with 2 logs with paddles, 35" diam.

JAW CRUSHERS, GYRATORY CRUSHERS, ROLL CRUSHERS, DRYERS AND KILNS, HOISTS, CARS, CRANES, SHOVELS, ETC.

WE WILL BUY ANY MODERN PIECE OF EQUIPMENT ANYWHERE.

**A. J. O'NEILL**
**Lansdowne Theatre Building**
**LANSDOWNE, PA.**
**Phila. Phone: Madison 8300**

## FOR SALE

1—1036 CEDAR RAPIDS Super Tandem Model 11 Portable Gravel Plant. Guaranteed—A real money maker.

1—BYERS 3-drum Hoist and Swinger with 25 H.P. Electric motor and controls.

1—OSGOOD 1¼ yd. Gas Shovel. Priced under 55%.

1—ATHEY—13 yd. Bottom Dump Crawler Wagon.

1—60"x25' TRAYLOR Revolving Screen—Very good.

We need all kinds of equipment for active construction. Send us your list or tell us what you need.

**PATTERSON EQUIPMENT COMPANY**
**1468 West 9th St. Cleveland 13, Ohio**
**Phone—Cherry 0439**

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**New and Factory-Rebuilt CLAMSHELL BUCKETS**

**PORTABLE TRUCK LOADERS • PORTABLE CONVEYORS**

**GEORGE HAISS MANUFACTURING CO., 142nd & RIDER AVE. NEW YORK, 51, N. Y.**

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1—Lorain 40 Shovel Backhoe Comb.
1—¾ Yd. McMyler Steam Shovel-Crane
1—½ Yd. Byers Truck Crane
1—¾ Yd. Digging Clamshell Bucket
2—Galion, 10 ton, 3 wheel, Rollers
1—5 Ton, 3 wheel Buffalo Springfield Roller
1—5 Ton Tandem Roller, Buffalo Springfield converted to gas.
1—50 Ft. Bucket Elevator
1—35 Ft. Bucket Elevator
1—60 Ton Steel Bin
1—Rotary Screen
1—1½ Ton Farasey Pug Mill
1—Platform Scale with Batch Hopper
2—Concrete Block Machines

**Industrial Steel and Supply Company**
1468 W. 9th St. Cleveland 13, Ohio
Telephone MAin 4106

## FOR SALE — ALL IN EXCELLENT CONDITION

1—**Superior McCully 10" Fine Reduction Crusher** No. 6290—Manganese fitted and cast steel frame except top shell cast iron. Price at Dell Rapids, South Dakota.....$ 8,000
1—**200 TPH ALL STEEL Gravel Plant Complete** at Hawarden, Iowa. Detailed information and photos on request..... 40,000
1—**6 x 5 Allis Chalmers Centrifugal Pump** Serial No. 18434. Mounted on cast base for direct connection to electric motor. 1500 GPM 180 ft. head, 1760 RPM. At Hawarden, Iowa ..... 200
1—**36" x 8' Revolving Screen.** Iowa Manufacturing Serial No. 2737 at Dell Rapids, South Dakota ..... 250

WRITE WIRE PHONE

**L. G. EVERIST, Incorporated**
302 Paulton Building Phone: 6845
Sioux Falls, South Dakota

Brooks Load Luggers, latest model CH-200, including 2 cu. yd. buckets. Like new. $750.00.
Linn-Trac-Tractors, 8 cu. yd. New 1942. $2000.00 each.
2540 R.B. Cedar Rapids Portable Crushing Plant, 40" x 20" primary, 10" x 36" jaw, complete, conveyors, bin.
S-25 Kennedy & 2 H. Telsmith 32" Red. Crushers; No. 5, 6 & 8 A.C. type K. Gyratory Crushers; No. 22 New Wisconsin Hammermill. 30 tons hourly agr. lime. $1360.00.

**M. WENZEL, 2136 Jefferson, Kansas City, Mo.**

Jaw Crushers; Universal 12 x 18". Farrell 18 x 36", 24 x 36". Acme 18 x 32". Carroll 24 x 36". Champion 22—24 x 50".
Gyratory Crushers; various sizes and makes.
Roll Crushers; Single, Fairmount 36 x 60".
Roll Crushers; Double, Johnson 48 x 48", 36 x 42", 28 x 32". Marion Mach 18 x 30". Wilmot 24 x 24". New Holland 24 x 30".
Hammer Mill; Gruendler 2XB. Williams AK-BX1.
Haiss Gas Crawler Bucket Loader, Waukesha Motor.
Jeffrey Steel Scraper Conveyor 41'5" C to C.
P&H 700 Crane Dragline, Fair Condition.
Diesel Engines; 60 HP Fairbanks 6 cyl. 180 HP.
Fairbanks 32-E. 125 HP Venn Severin, Rebuilt.
Bucket Elevators; 10 x 6" buckets 68' Centers.
Four 4 yard 36" Ga Koppel Heavy Duty Dump Cars.

**MID-CONTINENT EQUIPMENT CO.**
Pa 2290 710 Eastgate, St. Louis 5, Mo.

1—24 x 36" Traylor Jaw Crusher
1—22 x 50" Good Roads Jaw Crusher
1—13 x 24" Farrell Jaw Crusher
40" Telesmith Reduction Crusher
32" Telesmith Reduction Crusher
6" Gates Reduction Crusher
36" Sand Classifier
24" x 96" Apron Feeder
5—1937 Ford Dump Trucks
1—3 yard Jaeger mixer on Brockway Truck

**BLUE BALL MACHINE WORKS**
Blue Ball, Pa.

1¼ yd. Osgood Shovel with 4 cylinder Hercules Motor.
¾ yd. P. & H. Shovel Crane, model 206 with 4 cylinder Waukesha Motor.
36x24 Farrel Jaw Crusher, manganese jaws.
36x18 Farrel Jaw Crusher with 50 HP motor.
24x12 Champion Jaw Crusher #5.
20x10 Reliance Jaw Crusher, like new.
13B Telsmith Gyratory Primary Crusher.
#38 Kennedy Reduction Crusher with 75 HP synchronous motor built in flywheel, in very good condition.
26x20 Cinder Roll Crusher with brass bearings.
50' box-type crane boom, heavy construction.
¾ yd. Blaw-Knox Dreadnought Combination Bucket, serial #B.10509.
800'—1¾" cable, like new, on reel.
3—14'x30" Lewis Foundry Worm Washer with brand new steel troughs, bearings and worms.
1—5'x10' double deck Niagara Vibrator Screen.
1—5'x10' single deck Niagara Vibrator Screen.
1—4'x12' double deck Telsmith Vibrator Screen.
2—5'x24' Traylor Revolving Screens.
1—4'x18' Telsmith Revolving Screen.
1—3'x16' Acme Revolving Screen.
1—30"—66' center belt bucket elevator.
1—16"—45' center chain bucket elevator.
1—18" by 110' belt conveyor with frame and belt.
1—24" by 120'—140'—200' belt conveyor with frame and belt.
1—30" by 80'—165' belt conveyor with frame and belt.
1—20' by 90' belt conveyor with frame and belt.
200' of 110 chain, 200' of 110S chain, 300' of 111 chain, 120' of 133S manganese chain, all practically like new.
Electric Motors—90 HP, 650 RPM; 50 HP, 900 RPM; 30 HP, 1150 RPM; 25 HP, 900 RPM; 15 HP, 1750 RPM; 10 HP, 1750 RPM; 5 HP, 1200 RPM.

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R. D. No. 2, Reading, Pa.
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Insley, Type C, ½ yd., Gas Shovel on Cats, ¾ swing, 17' boom, 12'6 stick. Rebuilt—Below OPA Ceiling.

¾ yd. single line and 2 yd. Industrial bucket.

**The Industrial Equipment Corp.**
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Warehouse: Carnegie, Pa.

## FOR SALE OR RENT

1—Bucyrus-Erie Model D2 Diesel Driven one cu. yd. Combination Shovel-Crane and Dragline complete with 1 cu. yd. dipper bucket and 1 cu. yd. Page dragline bucket.

1—B2 Erie Steam Crane with 45 HP heavy duty boiler—40 ft. boom.

**MAHONEY-CLARKE, INC.**
217 Pearl Street, New York 7, N. Y.

## LOCOMOTIVE FOR SALE

20 ton American Saddle Tank, steam, standard gauge locomotive, in good condition. Located St. Louis, Mo. Also 1 six and 1 eight yard Heil Hydraulic DIG N CARRY Scrapers, rebuilt. Location Mt. Sterling, Ky.

**O. C. EVANS**
Mt. Sterling, Ky.

## RAILS NEW AND RELAYING

MOST ALL SECTIONS IN STOCK also spikes, bolts, frogs, and switches available.
500 BRICK DRYER CARS
Always in the Market to buy surplus material. Send us your inventories.

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480 Lexington Ave Park Building
New York City Pittsburgh, Penna.
Blitz Bldg., Reno, Nevada Havana, Cuba

## LOCOMOTIVES SHOVELS - - - CRANES CARS

1—65 ton American 0-6-0 standard gauge separate tender switcher, 20x26" cylinders, ASME boiler, ICC papers.
1—50 ton Porter 0-4-0 standard gauge saddle tank switcher, National Board and Ohio standard boiler. Built 1928.
1—33 ton Vulcan 0-4-0 standard gauge saddle tank switcher, ASME boiler.
1—72½ ton Baldwin 0-6-0 standard gauge separate tender switcher, 20x26" cylinders. Full time ICC papers.
The above locomotives are now being rebuilt for prompt delivery.

1—40 ft. steel underframe flat car, 50 ton.
1—60 ft. steel underframe flat car, 40 ton.

1—2 yard Hayward rehandling 2 line clamshell bucket, completely overhauled.

**Birmingham Rail & Locomotive Company**
Birmingham 1, Alabama

2—No. 200 Rex double pumpcretes, excellent condition, with Waukesha 6-cylinder gas engines complete with pugmill remixers and 1,200 ft. 8" pipe.

2—30B Diesel driven caterpillar cranes with dragline and shovel attachments.

1—No. 480 Marion steam crawler crape without attachments.

1—Complete I-R No. 54 drill steel sharpener with one 27F oil furnace, one JF furnace, one shank and bit punch, cut-off machine, etc., etc., in guaranteed condition.

1—5 Cubic yard Owen clamshell bucket—weight 27,000 lbs.

**GREAT LAKES DREDGE & DOCK CO.**
122 So. Michigan Ave., Chicago 3, Ill.

## SCALES — FOR SALE

Railroad Scales—125 Ton, Rebuilt
Truck Scale—20 Ton, Rebuilt
Truck Scale—15 Ton, Rebuilt

New Scales — Immediate Shipment

**WINSLOW SCALE CO.**
Terre Haute, Indiana

The following equipment must be sold quickly. No reasonable offer rejected. Material located in Metropolitan District. Can arrange for immediate inspection.

1—Bucyrus 70-C Steam Shovel No. 1754.
1—Vulcan Locomotive 12" x 16" No. 2698 Saddle tank, steam with air brakes.
1—Vulcan Locomotive 12" x 16" No. 3812 Saddle tank, steam with air brakes.
3—Western 20 yd. two way dump cars air dump with Automatic lock.
1—Style "K" Gates Crusher Mfg. Allis-Chalmers Mfg. Co. No. 5961
2—29 ton Hydraulic jacks, Watson Stillman Mfg. Co.
2—35 ton Duff Mfg. Co.
1—Caterpillar Tractor Model Sixty La Plante-Choate bulldozer.
About 20 tons of 80-lb. rails with splice bars.

**BOX 825, c/o PIT AND QUARRY**
538 So. Clark St., Chicago 5

## FOR SALE

#66 Power Unit—Dredge Set
Fairbanks-Morse—Model 35
150-HP, 5 cyl., 8¾x10½" Diesel
RPM 500, FM clutch, 1 Radiator
#67 Power Unit-Diesel
Hercules—DHXB 5x6
#H 360383
6 Cyl., 110-HP
Clutch and Shaft Extension
1 Radiator, Battery and Starter
1 Heater
#14 Power Unit—Marine
4 Cyl. Gas—40-HP
"STERLING" #204057, Type HD
Reverse Gear, Bilge Pump
Circulation Pump

**Box 815 c/o Pit & Quarry**
538 So. Clark St., Chicago 5

## AT AUCTION

Dredges & Booster Pumps of

## SEABOARD SAND & GRAVEL CORP.

Port Jefferson, Long Island, N. Y.
to be sold at Auction

August 19th, 1944 at 12 Noon
on the premises

**Sale comprises the 20" hydraulic dredge "Whirlwind".**
Hull: Wooden 140' x 38' x 11'3"
Boilers: Two (2) B. & W. water tube 400 H.P. ea.
Main Engine: 700 H.P. triple expansion Morris Mach. Wks.
Cutter Engine: 12 x 12 Morris Mach. Wks.

**Ladder dredge "Elco".**
Hull & house: Steel 140" x 33" x 8'6".
Complete screening & crushing equipment.
Rotary scalping screen vibrating finishing screen
4' Simmonds Cone Crusher.
4' manganese buckets, 60' ladder.
Oil fired boilers on main engine.
Auxiliary power diesel electric generator set.

**Floating Booster Pump Hull and Motor.**
Hull: Wooden sheathed with creosoted felt and wooden sheathing 30' x 40' x 7'.
Motor—350 H.P., 3 phase, 60 cycle, 2200 volts.
585 RPM Full control panel.
30" pulley, 36" 3 ply leather belt.

**Floating Booster Pump complete.**
Hull: Wooden 36' x 65' x 8' sheathed with creosoted felt and wooden sheathing.
Motor—650 H.P., 3 phase, 60 cycle, 2200 volts.
591 RPM Full control panel.
Tex rope drive to 20" pump.
All accessories.

**About 20 wooden pontoons 8' x 20' x 5'.**

*The above equipment may be seen at Port Jefferson, N. Y., for the week preceding the sale.*

**SEABOARD SAND & GRAVEL CORP.**
**30 Vesey Street, New York 7, N. Y.**

# Immediate Delivery

Two—Link Belt, steam operated, full revolving cranes — capacity 9½ ton @ 100' R.

Tail Swing only 21'-9". Excellent for barge mounting.

Ideal for coal-sand-stone-ore-ashes or lifting.

Condition like new.

Travel on two 30" ga. tracks set at 19' ga. Real bargains.

**CHARLES DREIFUS CO.**
**1818 Widener Bldg., Philadelphia 7, Pa.**
Tel. Rittenhouse 7750

## USED EQUIPMENT AVAILABLE NOW

**GYRATORY CRUSHERS**
3—Gates #6
2—Gates #5

**ROTARY KILNS**
3—8'6 x 7'6 x 125'
1—7'6 x 7' x 125'
3—5'6 x 5' x 60'

**ROTARY DRYERS**
5—5'6 x 5' x 60'
1—5' x 30'

**PULVERIZERS**
8—42" Fuller Lehigh
1—30" x 24" Jeffrey Type A

**FULLER-KINYON PUMPS**
2—4" and 1—8", also valves

**SCREENS**
4—3' x 5' Hummer Double Deck

**MILLS**
1—Allis Chalmers Compeb 8' x 7' x 45'
1—Smidth Tube 5'6" x 22'
4—Krupp #8 Ball

**CENTRIFUGAL PUMPS**
3" to 18" Motor and Turbine Driven

**LOCOMOTIVES**
1—20 Ton GE Std. Gauge Elec.
1—8 Ton Vulcan Std. Gauge Gas

**SPEED REDUCERS**
6—Jones Herringbone 93.5 to 1-50 H.P.

**ELEVATORS AND CONVEYORS**
Bucket—all sizes
Belt—all sizes
Screw—8" to 16"

**BINS**
All sizes from 230 cu. ft. to 3500 cu. ft.

**STEEL BUILDINGS**
10—from 20' x 40' to 110' x 530'

**PARTIAL LIST ONLY**

**SEND US YOUR REQUIREMENTS IF THEY ARE NOT LISTED**

All this equipment is owned by us and may be inspected at Phillipsburgh, N. J.

**HEAT AND POWER COMPANY**
**45 Bond Street New York 12, N. Y.**
**Algonquin 4-3874**

## SPECIALS!

2—Marcy No. 64½ Steel Lined Ball Mills, with steel balls
1—3' Symons Cone Crusher
3—Allis-Chalmers Crushing Rolls, 36" x 15", 28" x 15"
2—Blake Jaw Crushers, 10" x 20", 9" x 15"
1—Single Roll Crusher, 18" x 16"
2—Oliver 5' x 8', 8' x 8' Rotary Continuous Filters
10—Bucket Elevators, 30' to 75'
8—Belt Conveyors, 20' to 50'
2—Vulcan Rotary Kilns, 7' x 120', 6' x60'
4—Vulcan, 6' x 64', 6' x 42', 4' x 40', 4' x 30' Rotary Dryers
2—Raymond Mills, 4 and 5 rolls
5—Tyler Screens, 3' x 5', 4' x 5'
2—Jeffrey Type "A" Hammer Mills, 36" x 24", 24" x 18"

*Partial List Only. Your Inquiries Solicited.*

**BRILL Equipment Co.**
225 WEST 34th STREET, NEW YORK 1, N.Y.

## DRAGLINES, SHOVELS, ETC.

Model 900 P & H Dragline. Fairbanks-Morse Diesel engine, 100' boom, 3 yard bucket. Rebuilt.
54-B Bucyrus-Erie Diesel Shovel, rebuilt, and 5 Model FD Euclid, diesel rear dump rebuilt trucks. Shovel and trucks to be sold as one unit.
Model 392 Marion Combination Shovel and Dragline. Buda-Lanova diesel engine. 2½ yard shovel front. 80' dragline boom. Rebuilt.
Model 701 Lima Dragline. Gasoline engine, 70' boom, 1¾ yard bucket. Rebuilt. 1¾ yard shovel front available for this machine.
Model 1500 Speedcrane. Gasoline engine, 60' boom, 1¼ yard bucket. Rebuilt.
Model 80 Northwest 2 yard shovel. Twin City oil engine. Rebuilt.
Model 7200 Marion Electric Walker. 100' boom, 7 yard bucket. Rebuilt.
Model FD Cletrac diesel Bulldozer. Rebuilt.
500 Cu. Ft. Ingersoll-Rand Air Compressor. Hesselman oil engine. Rebuilt.
Loomis "Clipper" Full Crawler gas powered Blast Hole Drill. Rebuilt.
Model 85 Northwest Dragline, 70' boom, 2½ yard bucket, Twin City oil burning engine. Rebuilt.

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Telephone HAZLETON, PA. 3906

## A GOOD INVESTMENT!

**FOR THE DURATION OR POST-WAR—SAVE DEMURRAGE, SWITCHING, EXTRA HANDLING COSTS, DAMAGING FOREIGN CARS, ETC.**

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80, Hopper, Double, 50-Ton
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150, Refrigerator, 40-Ft., 40-Ton
16, Refrigerator, 36-Ft., 30-Ton
15, Ballast, Composite, 50-Ton
25, Box, 36-Ft., 40-Ton
20, Dump, K & J Automatic, 16-Yd., 40-Ton
6, Dump, K & J Automatic, 20-Yd., 50-Ton
3, Dump, Koppel, Automatic, 20-Yd., 40-Ton
20, Flat, 40-Ft., 50-Ton
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All cars are priced to sell!

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39 years' experience
13490 S. Brainard Ave., Chicago 33, Illinois
*"ANYTHING containing IRON or STEEL"*

## FOR SALE

2—9" x 16" Cedar Rapids Jaw Crushers with new jaws.
1—8" x 24" Universal Crusher mounted on steel wheels with bucket elevator. New jaws.
1—10" x 20" Improved Allis-Chalmers Blake Jaw Crusher with new jaws.
1—24" x 30" New Holland Double Roll Crusher.
1—16" x 16" New Holland Double Roll Crusher.
1—12" Traylor Gyratory Crusher.
1—7" Newhouse Allis-Chalmers Gyratory Crusher with 60 H.P. Motor.
1—24" x 50' Portable conveyor. New belt.
2—1¼ cu. yd. Blaw Knox Clamshell bucket. Rebuilt.
2—1 cu. yd. Owen Type M Clamshells. Rebuilt.
2—1 cu. yd. Owen Type K Clamshells. Rebuilt.
2—1 cu. yd. Erie Clamshells. Rebuilt.
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2—½ cu. yd. Owen Type M Clamshells. Rebuilt.
1—⅝ cu. yd. Blaw Knox Clamshell. Rebuilt.
2—85 H.P. Cummins Diesel Power Unit.
1—20 Koehring Mixer, 4 cyl. Le Roi Motor.

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Rochester 1, Michigan

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*Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.*

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**CARLYLE**
THE RUBBER HEADQUARTERS

**CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED**

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ABRASIVE RESISTANT COVERS

| Width | Ply | Top-Bottom | Covers |
|---|---|---|---|
| 48" | 8 | 1/8" | 1/16" |
| 42" | 5 | 1/8" | 1/16" |
| 36" | 6 | 1/8" | 1/16" |
| 30" | 6 | 1/8" | 1/16" |
| 30" | 5 | 1/8" | 1/16" |
| 24" | 5 | 1/8" | 1/32" |
| 24" | 4 | 1/8" | 1/32" |
| 20" | 5 | 1/8" | 1/32" |
| 20" | 4 | 1/8" | 1/32" |
| 18" | 4 | 1/8" | 1/32" |
| 16" | 4 | 1/8" | 1/32" |
| 14" | 4 | 1/16" | 1/32" |
| 12" | 4 | 1/16" | 1/32" |

*Inquire For Prices - Mention Size and Lengths*

### TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

| Width | Ply | Width | Ply | Width | Ply |
|---|---|---|---|---|---|
| 18" | 6 | 10" | 6 | 6" | 5 |
| 16" | 6 | 10" | 5 | 5" | 5 |
| 14" | 6 | 8" | 6 | 4" | 5 |
| 12" | 6 | 8" | 5 | 4" | 4 |
| 12" | 5 | 6" | 6 | 3" | 4 |

*Inquire For Prices - Mention Size and Lengths*

### ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
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APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

| Size | Length | Per Length |
|---|---|---|
| 2½" | 50 feet | $28.00 |
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| 2" | 50 " | 23.00 |
| | 25 " | 13.00 |
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Specify Thread On Couplings

### SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

| I.D. Size | Length | per Length |
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| ¾" | 25 feet | $4.25 |
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| | 25 " | 6.25 |
| 1¼" | 50 " | 12.00 |
| | 25 " | 7.50 |
| | 35 " | 10.50 |
| | 40 " | 12.00 |
| 1½" | 50 " | 15.00 |
| | 25 " | 10.00 |
| | 35 " | 14.00 |
| | 50 " | 20.00 |

AIR HOSE

| I.D. Size | Length | per Length | Couplings |
|---|---|---|---|
| ½" | 25 feet | $5.00 | $1.50 Pair |
| | 50 " | 10.00 | 1.50 " |
| ¾" | 25 " | 6.25 | 2.50 " |
| | 50 " | 12.50 | 2.50 " |
| 1" | 25 " | 10.00 | 3.50 " |
| | 50 " | 20.00 | 3.50 " |

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UNITED STATES DEPARTMENT OF AGRICULTURE Soil Conservation Service, Spartanburg, South Carolina, July 14, 1944. Sealed bids will be received until 10:00 A. M., E.W.T., August 31, 1944, and then publicly opened, offering royalty for mining rights in connection with the sale of Feldspar, Vermiculite, and related minerals on Government-owned land located in the Piedmont Plantation Land Utilization Project, near Hillsboro in Jasper and Putnam counties, Georgia. Interested parties may obtain bid documents from the Soil Conservation Service, Spartanburg, South Carolina.

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One (1)—Sturtevant Vertical Emery Mill, new emery stones recently. Price $675.00.

Four (4)—Kent Maxecon Ring Roll Mills, in good running condition, may be seen in operation. Price each $1675.00.

One (1)—Bradley 3 Roll Pulverizer. Price $1150.00.

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Bellefonte, Pennsylvania

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1—400 KVA, 480 V. Gen. D/C 4-Val. Engine
1—65 HP High Pressure Loco. Type Boiler
1—10 Ton, 77 ft. Span O.E.T. Crane—AC
1—24"x24" Single Roll Crusher—Jeffrey
1—Set 16"x36" Manganese Crushing Rolls
1—No. 5 & No. 3 Austin Gyratory Crushers
1—750, 360, 210, 150, 120, 60 HP Full Diesels
1—3' Cone Crusher; "65" Caterpillar Tractor

**H. & P. MACHY. CO.**
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**FOR SALE**

1—21"x42" Single Roll McLanahan Crusher. Good shape. Extra set of fine segments 15 V-belts.

1—PA 50 International Power Unit. Like new.

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Box 740
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6—2-Cu. Yd. high-discharge 1941 model Jaeger truck mixers at $1250.00 each.

Also

1—Erie Type B Steam Shovel, $2500.00.

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1 Factory rebuilt 25x40 Cedar Rapids roller bearing Jaw Crusher, like new. Available August, 1944. Contact

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24 x 18" American Hammermill & Power Unit.
36 x 48" Traylor Jaw Crusher. (Texas)
75 HP to 500 HP Diesel Units.
Caterpillar Diesel tractor & bulldozer—70 HP.
80 and 150 HP Vertical and HRT Boilers.
20 Ton American Steel Guy Derrick.
1¼ yd. P&H 600-A Gas Dragline & Crane.

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One—30 ft. and one—25 ft. belt and bucket with 20 inch belt. Total enclosed and elevators used but a short time.
One 45 ft. with 18 buckets, open, elevator steel.
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One 36 by 10 rotary screen 1&½ inch mesh.
Two—Augers 12 inch. One 10 ft. other 6 ft.

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280 lbs. 2½" new manila rope.
Pressure tank with man hole ⅜", 42" 10'.
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1¼-yd. Byers-Master, gas, 50' boom, wide cats
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16 ton Vulcan 36" gauge gas locomotive. Fine condition. Specifications, photo & 2 x 2 transparency on request.

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Motor Truck Scales.....$440.00
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**FOR SALE**

Gruendler 2XB Swing Hammer Pulverizer with 3 sets of Limestone hammers and extra grate bars. In running condition.

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***WANTED TO BUY***

**CHAMPION DRAIN TILE MACHINES**

Reply to Box 735, care PIT & QUARRY
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Long established manufacturer with 3 "E" awards has opening for engineer who knows how to design and build concrete mixing machinery. Pleasant living conditions in Eastern small town near metropolitan area. No big money now—but a real future with a sensational new post-war product.

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**BUSINESS OPPORTUNITY**

Wanted a Young Aggressive Man with sales experience and a knowledge of the Manufacturing of Concrete Products and Building Material Specialties Business, to Purchase a One-Half interest in a going Corporation, whose Plant and Equipment is of the Most Modern Design affording maximum production at a minimum cost per unit. And through this Corporation's management, business ability and aggressiveness they enjoy the bulk of the best Concrete Products and Building Supplies Business in Monroe County and several surrounding Counties of New York State.
The $50,000.00 dollars that you will invest is for the purchase of Building Specialty Items for the Post War Expansion in this area. You will have an equal voice in the expenditure of your own money.
The Corporation has a very good Banking Reputation and Connections.
The location is Rochester, New York.
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*Quarries*
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1 yd. or 1½ yd. gas or diesel
**CRANES, DRAGLINES & SHOVELS**

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A well-known company operating several large plants in one of the middle Atlantic states has an opening for a general foreman of mechanized stone quarry and crusher operation. This is a permanent, postwar position. A skillful supervisor is required who knows how to maintain a high standard of maintenance and production. Only a first-class man will be considered and the salary is consistent with the stated requirements. Applications from persons now employed will be treated confidentially. Give your age, education, experience and salary most recently received.

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**WANTED:**

Cement plant superintendent with engineering education and experience. Location, northeastern section of United States. In applying, give education, positions held, age, marital status, salary expected, etc.

**Write Box 730, Pit and Quarry**
**538 S. Clark St., Chicago 5, Illinois**

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**BELTED:** 355, 528, 676, 1000, 1300 & 1570 Ft.
**ELECTRIC:** 478, 676, 807, 1302, 1722 & 2850 Ft.
**DIESEL:** 105, 315, 420, 603, 807 & 1000 Ft.
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### GRAPPLES & BUCKETS
50 Skips and Battleship Type, 2 to 6 Yds.
5 Owen & Bucyrus Rock Grabs.
**CLAMSHELL:** ½, ¾, 1, 1½ & 2 Yds.
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**DRAGLINE:** ½, ¾, 1, 1½ & 2 Yds. Cap.

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5 Ton BROWNHOIST, 30 Ft. Boom Gas.
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1½ Yd. Lima 759 Diesel.
1½ Yd. KOEHRING 601—Gas.

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46—KOPPEL 1½ Yd., 24 & 30 In. Ga., V Shaped.
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6x8 Continuous Pebble Mill.
5x5 Batch Mill.
5'x22" HARDINGE CONICAL Dry Ball Mill.
6'x22" HARDINGE CONICAL Pebble Mill.
4x8, 8x6, & 10x9 Straight Ball Mills.
8'x22" HARDINGE CONICAL Ball or Pebble Mill.
4x16, 5x18, 5x22, & 6x22 Tube Mills.
3½x8 & 5x7 Air Swept Tube Mills.
2x4½, 5x12 and 6x12 ROD MILLS.
4x16 Smidth Tube Mill Silex.
5½x20 Smidth Tube Mill Mang. Lining.
5½x18 P & M Tube Mill Silex.

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RAYMOND Auto. Pulverizer No. 0000, 0 & 3.
RAYMOND Imp Mills No. 4, 32 & 55.
GRUENDLER XXB Mill & Jay Bee No. 3 & 4.
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### SEPARATORS AND COLLECTORS
14 ft., 8 ft. and 12 ft. Separators

### ROLL CRUSHERS
36x60 Fairmont Single Roll.
36x20 Diamond Double Roll.
24x24 & 36x16 & 36x20 Diamond Double Roll.

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10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 26x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x15, 36x9, 36x6, 36x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
30x10 Gruendler Roller Bearing.

### CONE & GYRATORY CRUSHERS
18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
21K & 18N Allis Chalmers.
4—10 TZ Traylor 4 Ft. Gyratory.
4—Nos. 5, 3 & 6 Austin Gyratory.
2—Traylor T-12 Bulldog Gyratory.
8 in. Traylor T. Gyratory, Telsmith No. 9.
17 Gates K—Nos. 3, 4, 5, 6, 7½, 8 & 9½.
10 Inch Austin Model 10d.
6, 10 & 13 Inch Superior McCullys.
KENNEDY: Nos. 19, 25, 27, 39 & 49.
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7 Ft., 5 Ft., 4 Ft., 3 Ft. and 2 Ft. Symons Cone.

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29T ARMSTRONG Well Drill.

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Nos. 4, 6 & 8 Williams Jumbo.
No. 36 Am. Ring Roll.
Gruendler No. 6X.

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5—1 yd. 2 yd. & 3 yd. Mixers.
3—1000 Lb. & 2000 Lb. Pug Mixers.
6—3, 5, & 10 Ton Asphalt Rollers.
5—½, 1, & 2 Ton Asphalt Plants.

### ASPHALT EQUIPMENT
7—750 & 1000 Gal. Distributor Trucks.
3—1000 Lb. & 2000 Lb. Pug Mixers.
6—3, 5, & 10 Ton Asphalt Rollers.
5—½, 1, & 2 Ton Asphalt Plants.

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60 HP Fairbanks Morse.
140 HP Fairbanks Morse.
200 HP Atlas.

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300 K.W. Worthington 3/60/2400 v.
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30 K.W. Buda 110 v.

### RAYMOND MILL
5 Roll High Side.

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**IDLERS:** 36 In., 30 In., 24 In., 20 In., 18 In.
Head & Tail—Pulleys—Takeup for all sizes.
Steel Frames: 2,000 Ft. 24 In., 30 In. & 36 In. Sections.

### ROTARY DRYERS AND KILNS
36 In. x 20 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 5 Ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 70 Ft., 70 In. x 40 Ft., 5x30 & 8x84 Double Shell Dryers, 8x110, 7½x100, 8x125 & 10x20 Kilns.

### STEEL DERRICKS
**GUY:** 6 Ton 85 Ft. Boom, 15 Ton 100 Ft. Boom, 20 Ton 115 Ft. Boom, 50 Ton 100 Ft. Boom.
**STIFF LEG:** 5 Ton 70 Ft. Boom, 15 Ton 100 Ft. Boom, 25 Ton 100 Ft. Boom, 75 Ton 135 Ft. Boom.

### LOCOMOTIVES
**DIESEL:** 7—4½, 8 and 15 Ton 36 & 42 In. Ga.
**GASOLINE:** 3 Ton, 5 Ton, 8 Ton, 12, 14 & 30 Ton.
**STEAM:** 9 Ton, 20 Ton, 40 Ton, 60 Ton & 80 Ton.
**ELECTRIC:** 2 Ton, 5 Ton, 8 Ton, 17 Ton & 40 Ton.

### SCREENS
**VIBRATING:** 2x4, 3x6, 2x8, 3x8, 3x5, 4x5, 4x8, 4x10, 48x72. HUMMER, ROTEX, NIAGARA & ROBINS, LINK BELT & HURON.
**REVOLVING:** 3x12, 3x16, 3½x18, 3x24, 4x16, 4x20, 4x23, 4x24, 5x30, 5x36, 6x20.

### STEEL STORAGE TANKS
35—4000, 5000, 6000, 8000, 10000, 15000 and 20000 gal. cap. Horizontal and Vertical.
50000 gal. on 100 ft. tower.
60000 gal. on 85 ft. tower.
100000 gal. on 100 ft. tower.

### RAILROAD CARS
12—50 Ton Cap. Battleship Gondolas.
7—50 Ton Cap. Flat Cars.

### SAUERMAN DRAG AND SLACKLINES
1—¾ yd. Gas 1—1½ yd. Electric
1—1 yd. Electric 3—2 yd. 3 yd. & 4 yd. Electric

### R. R. TRACK SCALE
125 Ton 56' x 10'6" Platform 4 Section.

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5 Clyde 75 to 100 Ft. Boom.

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5 I.R. 4K Shank Grinders.
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7 Sullivan Class A. & C.
8 Gardner-Denver 3A & No. 6DS.

### MINE LOADERS
5 Elmco, GD. & Conway.

(Cable Address: "STANEQUIP" New York)
Lincoln Bldg., 60 E. 42nd St., New York, N. Y.
Murray Hill 2-3075 or 2-3076

**R. C. STANHOPE, INC.**

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## WANTED:

**Will purchase immediately any of the following items:**

1—Fine crusher, either 3' Symons, No. 37 Kennedy, or 4' Traylor
1—5'x10' Three-deck vibrating screen
2—3'x8' Single-deck vibrating screen
5—60' Bucket elevators with 8"x16" buckets with C132 chain, or equal, and K2 attachments every third link.
3—50' Bucket elevators with 8"x16" buckets with C132 chain, or equal, and K2 attachments every third link.
1—45' Bucket elevators with 8"x16" buckets with C132 chain, or equal, and K2 attachments every third link.
1—40' Bucket elevators with 8"x16" buckets with C132 chain, or equal, and K2 attachments every third link.
1—55' Bucket elevators with 8"x18" buckets with C132 chain, or equal, and K2 attachments every third link.
2—65' Bucket elevators with 7"x14" buckets with C132 chain, or equal, and K2 attachments every third link.
2—16" Screw conveyors and troughs 168' long—⅜" flights.
2—16" Screw conveyors and troughs 132' long—⅜" flights.
3—16" Screw conveyors and troughs 120' long—⅜" flights.
2—16" Screw conveyors and troughs 108' long—⅜" flights.
1—16" Screw conveyors and troughs 36' long—⅜" flights.
1—16" Screw conveyors and troughs 24' long—⅜" flights.
2—16" Screw conveyors and troughs 12' long—⅜" flights.
1—12" Screw conveyors and troughs 84' long—⅜" flights.
3—12" Screw conveyors and troughs 36' long—⅜" flights.
15—All steel, side dump quarry cars, 10-12 cubic yards, standard gauge.
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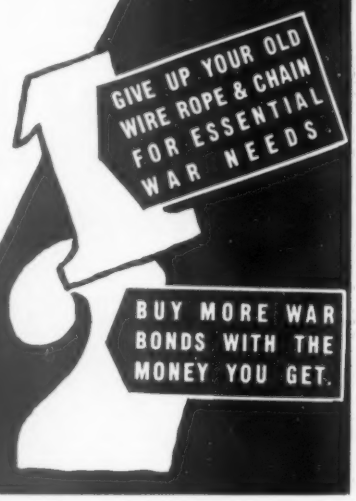


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## Index to Advertisers


Acme Equipment Company.....120
*Allis-Chalmers Tractor Division.. 16
*American-Cable Div. American Chain & Cable Co., Inc.....Inside Back Cover
*American Chain & Cable Co., Inc. .....38, Inside Back Cover
*American Pulverizer Co..... 80
American Rubber Mfg. Co.....115
*American Steel & Wire Company. 8
Anchor Concrete Mchy. Co..... 91
Atlas Powder Co. ..... 19
*Austin Western Company, The...100

*Babcock & Wilcox Co.....116
Bacon, Inc., Earl C..... 79
*Barber-Greene Co. .....104
Barrett Cravens Company..... 93
*Bemis Bro. Bag Co..... 6
Birmingham Rail & Loco. Co.....121
*Blaw Knox Division of Blaw Knox Co. .....114
Brennan, George E.....124
Brill Equipment Co.....122
Bristol Company, The..... 76
Broadcast Section .....118-127
*Brooks Equipment & Mfg. Co....116
Buckeye Traction Ditcher.....108
Buda Co., The..... 19
*Buell Engineering Co., Inc..... 34
*Buffalo Wire Works Co., Inc.... 79
*Builders-Providence, Inc. ..... 82
Burnham, Royal E. .....124

Carlyle Rubber Co., Inc.....123
Chicago Perforating Co..... 74
*Chicago Pneumatic Tool Company.107
Cleveland Pneumatic Tool..... 18
Cleveland Rock Drill Company.... 18
Cleveland Wire Cloth & Mfg. Co.112
Columbia Steel Company..... 12
*Columbus Conveyor Co.....116
Commercial Shearing and Stamping Co. ..... 90
Consolidated Products Co., Inc...126
Continental Gin Co.....113
Cooper-Bessemer Corp..... 3

*Deister Machine Company..... 69
*Denver Equipment Co.....116

De Soto Foundry, Inc..... 72
*Diamond Iron Works, Inc.....114
Dreifus, Charles .....122
Dundee Engineering Company....124

*Eagle Crusher Company.....117
*Eagle Iron Works..... 77
Electric Storage Battery Co..... 16
*Ensign-Bickford Co., The.....102
Equipment Corporation of America .....120-127
*Erie Steel Construction Company. 91

Ferryview Sand & Gravel Co.....120
Flink Implement Company.....114
*Fuller Co. ..... 14

Gar Wood Industries, Inc.....103
Gates Rubber Co., The..... 4
*Gruendler Crusher & Pulverizer Co. .....115
Gulf Oil Corp..... 5

Haiss Mfg. Co., Inc., Geo.....120
*Hanson Clutch & Machinery Co..128
*Hardinge Co., Inc. ..... 78
Harnischfeger Corporation, P. & H. ..... 24
*Hazard Wire Rope Division, American Chain & Cable Company, Inc. ..... 99
Heat and Power Co., Inc.....122
Heidenreich, Jr., E. Lee.....124
*Hendrick Mfg. Co. .....112
Hendy, Joshua, Iron Works..... 25

Industrial Steel & Supply Company .....121
Inland Equipment Company.....119
*Iowa Manufacturing Co..... 23
Iron & Steel Products Co....119-123

*Jaeger Machine Co., The.....93-115
*Jeffrey Mfg. Co. .....110
*Jones & Laughlin Company.....117
Jones Company, The W. A.....113

*Kennedy-Van Saum Mfg. & Eng. Corp. ..... 26
Kensington Steel Company..... 68
Kent Machine Co..... 90
Klatzky Brothers .....120
Koehring Company ..... 22
Kremser & Sons, Inc., Frank A..121
*Kron Scale Division, Yale & Towne Manufacturing Company.109
*La Plant-Choate Company..... 70
*Laughlin Co., Thomas..... 74
*Link Belt Co. ..... 1
Ludlow-Saylor Wire Co..... .....Inside Front Cover

*Machin Company, E. C..... 76
Mack Trucks, Inc.....111
Manhattan Rubber Mfg. Division of Raybestos Manhattan, Inc... 21
Marion Steam Shovels Co., The.. 15
*Merrick Scale Mfg. Co..... 88
*McLanahan & Stone Corp.....117
Mir-o-Col Alloy Company..... 80
Mott Core Drilling Company....112
*Multiplex Concrete Machy. Co... 92

National Powder Company..... 31
Neff & Fry Company..... 93
Newell Co., William, The.....120
New Holland Machine Co..... 74
*Nordberg Mfg. Co.....105

O'Neill, A. J. .....120
Ottawa Steel Products Co.....116
*Owen Bucket Co.....128

Page Engineering ..... 71
Patterson Equipment Co.....120
Pennsylvania Drilling Co.....124
*Pioneer Engineering Works, Inc..117
*Porter Co., H. K..... .....Outside Back Cover
Portland Cement Association.... 93

*Raymond Pulverizer Div. of Combustion Engineering Co., Inc...106
Reid-Holcomb Company .....119
*Roebling's Sons Company, John A. 75
Rollway Bearing Company, Inc... 8

St. Regis Paper Company..... 29
*Sauerman Bros., Inc..... 91
Schaffer Podiometer Co..... 73
Schramm, Incorporated ..... 33
Seaboard Sand & Gravel Co.....122
Simplicity System Company.....116
Sinclair Refining Company (Inc.) 67
*Smidth & Co., F. L..... 10
Smith Engineering Works..... 20
Smith & Co., Inc., Gordon..... 78
*Smith Company, The T. L..... 94
Southern Iron & Eqpt.....125
Sprout, Waldron & Co., Inc.....116
Standard of California..... 13
Stanhope, Inc., R. C.....125
*Stearns Mfg. Co..... 81
Stoody Company ..... 97
"Stone"—The Crane Man.....125
Straub Mfg. Co..... 98
Swabb, Frank .....123

Thornton Tandem ..... 95
*Traylor Engineering & Mfg. Co... 7
*Tyler Co., The W. S.....112

United States Department of Agriculture .....123
*United States Steel Corporation.. 12
United States Rubber Company.. 99
United States Treasury Dept.....111
*Universal Vibrating Screen Co...116
Unverzagt & Sons, G. A.....119
Upson Walton Company..... 2

Van Der Horst Corporation of America ..... 27

Walsh Co., Richard P.....119
Walsh, W. T. .....119
*Wellman Engineering Company...110
*Westinghouse Electric & Manufacturing Company ..... 9
West Side Cable Company.....101
*Wickwire Spencer Steel Company.109
*Williams Patent Crusher & Pulverizer Company .....112
Wood, Gar .....103
*Worthington Pump & Machinery Company ..... 17

Yale & Towne Mfg. Co., The.... 96
Yates Machine Works.....123


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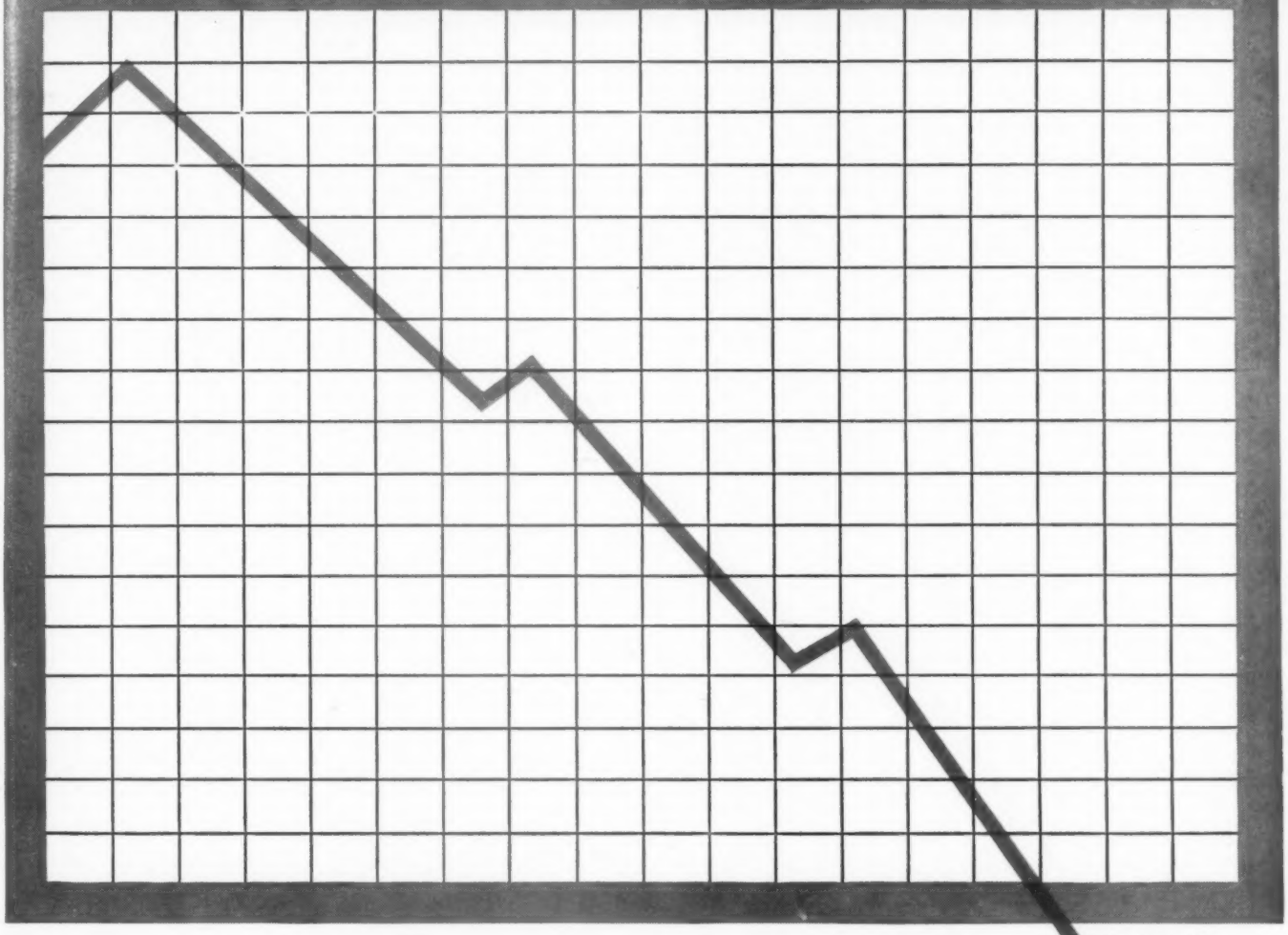

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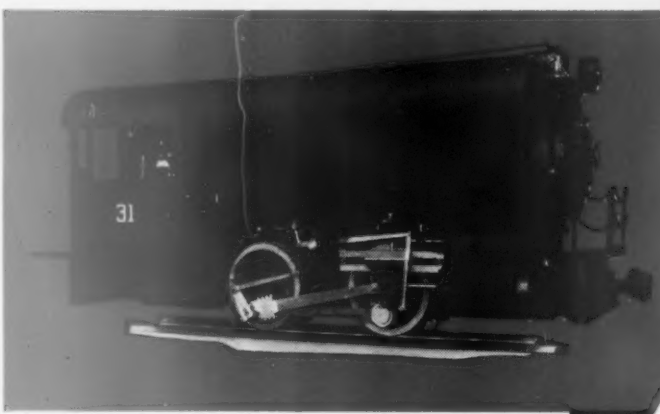


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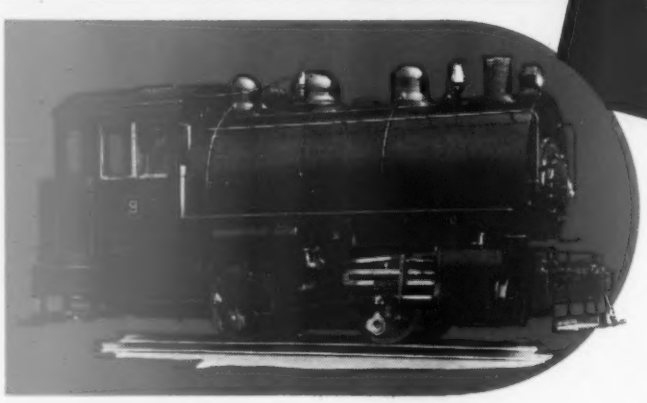

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